

# Overview

## Scope of this Document

The iPhone Xs and iPhone Xs Max Service Guides provide troubleshooting steps, take-apart procedures, and other information about these models only. Separate service guides cover other iPhone models.

## Features



Available in space gray, silver, and gold.

iPhone Xs and iPhone Xs Max features:

- A12 Bionic chip with neural engine
- Super Retina HD display
- Dual 12-megapixel wide-angle and telephoto cameras
- 7-megapixel TrueDepth camera
- Face ID
- Splash, water, and dust resistant



1. Volume up/down buttons
2. Ring/silent switch
3. Proximity sensor
4. Ambient light sensor
5. Receiver (stereo speaker)
6. Front camera
7. TrueDepth cameras
8. Side button
9. True Tone flash
10. Microphone
11. Bottom microphones
12. Lightning connector
13. Stereo speaker

### Service Considerations

**Important:** Before servicing a device, ensure that the user has disabled Find My iPhone in Settings. Refer to [HT201365: Find My iPhone Activation Lock](#) for more information.

If performing a whole unit replacement for an iPhone that is a trusted device for two-factor authentication, do not erase the device until the user has set up a replacement iPhone. Refer to [HT204915: Two-factor authentication for Apple ID](#) for more information.



There are several ways to find the iPhone serial number and IMEI/MEID. Refer to [OP1981: iPhone serial number retrieval](#).

Refer to the [Visual/Mechanical Inspection \(VMI\) Guide](#) for specific model numbers and configuration codes.

- **Reset:** Press the Volume Up button. Then press the Volume Down button. Then press and hold the side button until the screen goes black and the Apple logo appears.
- **Recovery Mode:** Plug the device into a computer with iTunes open. Press the Volume Up button. Then press the Volume Down button. Then press and hold the side button until the screen goes black and the recovery mode screen appears.
- **Stereo Speakers:** The receiver and bottom speaker are used together as stereo speakers. The left and right sound channels are routed to the speaker or receiver based on the orientation of the iPhone.
- **Cameras:** The cameras used in iPhone Xs and iPhone Xs Max periodically self-calibrate to capture sharp images. When iPhone is placed on a level surface for five to ten seconds, the camera will perform a quick calibration. When iPhone is plugged in and placed on a level surface for five to ten minutes, the camera will perform an extended calibration. During the extended calibration, iPhone may become warm to the touch.
- **Apple Pay in Japan:** iPhone Xs and iPhone Xs Max sold in Japan have specific hardware that allows customers to make Apple Pay purchases at stores in Japan. iPhone Xs and iPhone Xs Max sold in Japan cannot be used to make Apple Pay purchases at stores outside of Japan. Apple Watch models sold outside of Japan are not able to complete Apple Pay transactions at stores in Japan. Refer to [HT201239: Using Apple Pay in stores, within apps, and on the web](#) and [HT207154: Using Suica on iPhone or Apple Watch in Japan](#).  
**Important:** For Japanese devices, have the user remove all Suica cards from Apple Pay before proceeding with service.

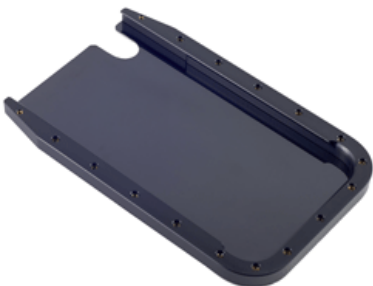
## New Tools and Fixtures

To open iPhone Xs and iPhone Xs Max, use an updated Universal Display Removal Fixture and the Display Removal Fixture Adapter with the suction cups correctly positioned. Position the suction cups closest to the bottom of the display without overlapping the edge.

Use the Display Press to apply the correct pressure for 30 seconds to properly adhere the display to the enclosure. Refer to [RP1437: Open Device](#) or [RP1443: Open Device](#) for more information.

For more information about updating your existing fixtures, refer to [TP1531: iPhone Fixture Update - Universal Display Removal Fixture and Display Press](#).

If the back cover is damaged, apply a 5.8-inch Back Protective Cover (923-02233) or 6.5-inch Back Protective Cover (923-02668), then place the iPhone in the 5.8-inch Support Frame (923-01922) or 6.5-inch Support Frame (923-02665) before attempting to open the device.



### Caution:

- An incorrect position or the use of other fixtures may damage the device. iPhone Xs and iPhone Xs Max will only fit correctly in the appropriate repair tray.
- Fixtures that clamp the iPhone may damage the enclosure. iPhone Xs and Xs Max displays are adhered to the enclosure.

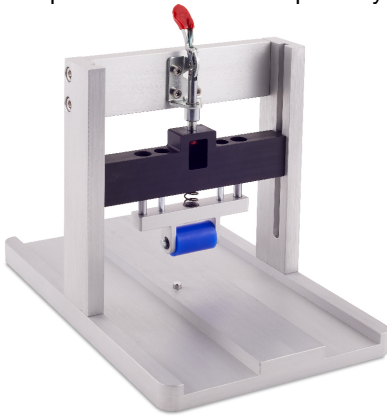
After opening the device, use the new 5.8-inch Repair Tray (923-02661) or 6.5-inch Repair Tray (923-02662) to support it. The 5.8-inch Repair Tray is identified by a plus sign on the upper-right corner. The 6.5-inch Repair Tray is identified by an infinity sign on the upper-right corner.



The display cowlings in iPhone Xs and iPhone Xs Max are installed using trilobe screws that require a MicroStix bit (923-01290) to remove them.



iPhone Xs and iPhone Xs Max require the new iPhone Battery Fixture to secure a replacement battery. This fixture is only compatible with the new repair trays.



Screws replaced during a repair must be tightened to a specific torque value. There are four iPhone torque drivers to set screws to the correct torque value. Use only the driver that is specifically called for in the take-apart instructions. The correct driver is also noted in the screw diagram section of [TP1670: Internal View, Parts List, Screw Diagram](#) and [TP1671: Internal View, Parts List, Screw Diagram](#).

1. Torque driver (gray), 0.55 kgf-cm (923-00738)
2. Torque driver (black), 0.35 kgf-cm (923-0245)
3. Torque driver (green), 0.45 kgf-cm (923-00105)
4. Torque driver (blue), 0.65 kgf-cm (923-0448)



# iOS

## Overview

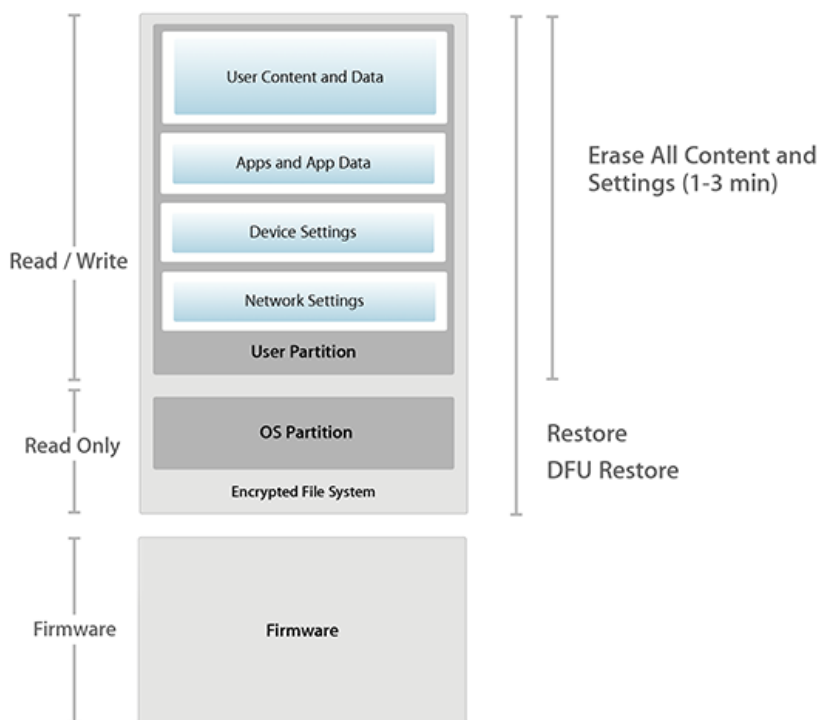
iOS 12 is the latest mobile operating system for iPhone, iPad, and iPod touch. iOS 12 is compatible with iPhone 5s or later, iPad mini 2 or later, iPad Air, iPad (5th and 6th generation), iPad Pro, and iPod touch (6th generation).

## Service Considerations

### Restore Types and File System

If the device is connected to iTunes, then updating the software may resolve an issue without erasing content and settings. If updating the software does not work, then it may be necessary to restore the device, which will erase all content and settings. Most issues reside in the read/write portion of the file system; the user cannot modify the read-only portion.

DF Reset and DFU Restore are not necessary to troubleshoot iOS device issues. Restore and Recovery Mode Restore take less time to accomplish the same result. If the device will not go into Recovery Mode or will not charge, then follow the troubleshooting steps in the Service Guide.



## Troubleshooting

Refer to [TP880: Common Troubleshooting Procedures](#) for more details.

Use the following steps to isolate a software issue:

1. Have the user create a backup (using either iCloud or iTunes) to save the device's data. Refer to [TP322: Back Up User Data](#) for more details.
2. Update the device to the latest software.
3. Restart the device.
4. Choose Settings > General > Reset > Erase All Content and Settings to erase all content and settings.
5. Set up the device as new, without restoring from backup.
6. Test the device hardware and iOS for the original issue. If the issue cannot be reproduced, do not replace the device.
7. Restore from backup. If restoring from either backup (iCloud or iTunes) causes the software issue to return, then there is no reason to restore from the other backup method as it will lead to the same result.

## iOS Diagnostics

Search GSX for "AST 2 for iOS Reference Guide - Table of Contents" for more information.

Apple Service Toolkit 2 (AST 2) is a cloud-based diagnostic system that helps technicians triage and verify repairs for most Apple devices.

AST 2 for iOS currently supports Apple Watch and Apple devices running iOS 8.1 or later.

Some diagnostic tests and tools in AST 2 require the device under test to be running iOS 9 or later.

Refer to [What's new in iOS 12](#) for more information about iOS.

## iTunes



iTunes may be used to restore or update a device to iOS 12. Download iTunes and see general system requirements at [www.apple.com/itunes/download/](http://www.apple.com/itunes/download/).

Some iOS features require an Apple ID. Refer to [TP318: Apple ID](#) for specific features and Apple ID troubleshooting.

# Back Up User Data

## Back Up User Data

Before troubleshooting a user's device, determine whether it is backed up with iCloud or iTunes.

**Note:** If restoring user data from one backup method (iCloud or iTunes) causes an issue to return, do not attempt to restore user data from the other backup method as it will lead to the same result.

### iCloud

Choose Settings > AppleID > iCloud > Manage Storage > Backups.



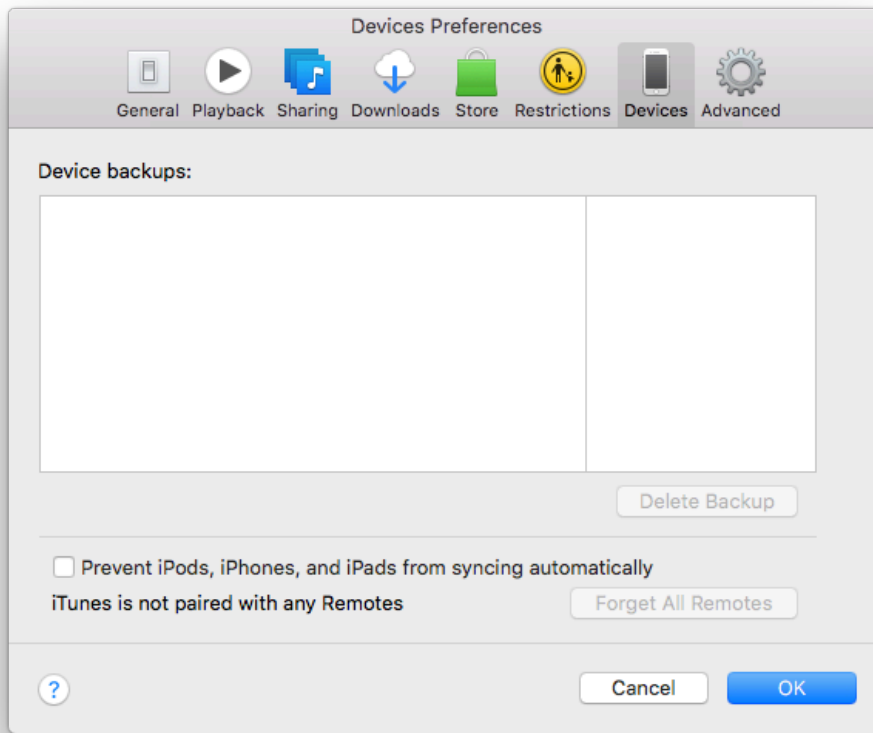
1.

Learn more about iCloud at [www.apple.com/icloud](http://www.apple.com/icloud). Refer to [HT207428: What does iCloud back up?](#)

### iTunes on user's computer

1. Connect the user's device to the user's computer.
2. Open iTunes.
3. Choose Preferences > Devices.
4. Verify the latest backup in the Device backups pane.

**Important:** To avoid syncing a user's device to a test computer, open iTunes, choose Preferences > Devices, and then select "Prevent iPods, iPhones, and iPads from syncing automatically."



Refer to the following articles:

- [HT203977: How to back up your iPhone, iPad, and iPod touch](#)
- [HT201274: How to erase your iPhone, iPad, or iPod touch](#)
- [HT203271: If your iTunes backup couldn't be completed or you can't restore from a backup](#)

# Cleaning Procedures

## Contents

This article includes the following sections:

- [Required Tools](#)
- [Dock or Lightning Connector \(iPhone, iPad, iPod\)](#)
- [Headphone Jack](#)
- [Speaker and Microphone](#)
- [Receiver \(iPhone\)](#)
- [SIM Tray](#)
- [Loop Holder \(iPod touch \(5th generation\)\)](#)
- [Lightning Connector for AirPods Charging Case](#)
- [Internal AirPods Charging Case](#)
- [Sanitize AirPods](#)

## Required Tools

- Lighted otoscope (or lighted magnifying glass)
- ESD-safe brush (922-9918)
- ESD-safe tweezers
- Microfiber cloth
- Compressed air (for AirPods lightning connector only)
- Foam swab
- Isopropyl alcohol (IPA) wipe
- Nitrile gloves



**Caution:** Never use compressed air to clean an iPhone, iPad, or iPod, as it can damage components.

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## Dock or Lightning Connector (iPhone, iPad, iPod)

Debris in the dock or Lightning connector can cause the following performance issues:

- Unable to charge battery.
- Device not recognized by iTunes, computer, or accessory.

Perform the following steps to clean the device:

1. Turn off the device.
2. Use a lighted otoscope or magnifying glass to inspect for debris.
3. Use an ESD-safe brush to delicately brush out debris. Be careful not to damage any metal contacts.  
**Note:** Avoid brushing debris into the speaker or microphone on either side of the dock or Lightning connector.
4. Use ESD-safe tweezers to carefully remove any large pieces of debris. Be careful not to damage any metal contacts.





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### Headphone Jack

Debris in the headphone jack can cause the following audio or functional issues:

- Device is stuck in headphone mode and no audio is heard from receiver or speaker.
- Headphone audio is distorted (static or crackles) or is not functioning.
- Headphone audio is only heard in one channel.
- Headphone microphone has distorted sound or no sound.
- Headphone connector will not fully fit into the headphone jack.



**Warning:** Do not use long metal tools (such as screwdrivers or dental picks) to clean inside the headphone jack as this could puncture the battery.

1. Use a lighted otoscope or magnifying glass to inspect for debris.
2. Use an ESD-safe brush to brush out lint or debris. Use just enough bristles to fit inside the headphone jack. Twist the bristles to loosen and lift out debris.



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## Speaker and Microphone

Debris blocking the speaker and microphone openings can cause the following audio performance issues:

- Low or distorted volume audio from the speaker.
- Muffled, low volume, or distorted audio recorded from the microphone.

Cleaning Procedure:

1. Use an ESD-safe brush to gently brush cover openings of the speaker and microphone.

**Note:** Brush debris away from the connector to avoid brushing debris into the dock or Lightning connector.



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## Receiver (iPhone)

Debris blocking the receiver opening can cause the following audio performance issues:

- Muffled, low volume, or distorted audio through the receiver

Cleaning Procedure:

1. Inspect the receiver for loose debris.
2. Use an ESD-safe brush to gently brush the cover mesh in the receiver opening to remove debris.  
**Caution:** Use extreme care to avoid damaging the microphone embedded within the receiver opening. Avoid using large sweeping motions across the glass, as this could lead to scratches.
3. Use a microfiber cloth to wipe away the loosened debris.



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## SIM Tray

Dirt and debris around the SIM tray can cause the following issues:

- Difficulty opening or closing the SIM tray.
- Dirt and debris entering the device when SIM tray is ejected and removed.

1. Eject SIM tray from device.



2. Use an IPA wipe to gently wipe around edges of SIM tray to remove dirt from edges.
3. Use an IPA wipe to gently wipe around edges of SIM tray slot on device to remove dirt from edge.
4. Inspect the SIM tray to verify that dirt has been removed.
5. If any dirt still remains, repeat steps 2 and 3.



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## Loop Holder (iPod touch (5th generation))

Debris blocking the loop holder can cause the following functional issues:

- Loop holder does not respond to touch.
- Loop holder does not open/close.

1. Use an ESD-safe brush to delicately brush out lint or debris. If needed, use ESD-safe tweezers to pull out any large pieces of lint or debris.



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### Lightning Connector for AirPods Charging Case

Debris in the Lightning connector can cause the following performance issue:

- Unable to charge the case battery.

Cleaning Procedure:

1. Use a lighted otoscope or magnifying glass to inspect for debris.
2. Blow away any loose debris with compressed air.



3. Use an ESD-safe brush to delicately brush out any remaining debris.



4. If needed, use ESD-safe tweezers to carefully pull out any large pieces of debris.  
**Caution:** Be careful not to damage any metal contacts.
5. Use compressed air to remove any remaining loose debris.
6. Clean the outside of the case with a microfiber cloth.



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### Internal AirPods Charging Case

Contaminated contacts or debris in the AirPods wells can cause the following performance issue:

- AirPods will not charge

**Caution:** Do not use compressed air to clean inside the AirPods wells as this can cause debris to get stuck behind the contacts.

1. Use a lighted otoscope or magnifying glass to inspect the AirPods wells for debris and the contacts for contamination.



2. Open an IPA wipe packet and insert the foam swab.



3. Press the foam swab inside the IPA wipe packet to transfer enough alcohol to moisten it.



4. Use the foam swab to gently rub the contacts in a vertical up-and-down motion.

**Caution:** To protect the spring finger contacts, do not twirl the swab or excessively force it on the contacts.



5. Gently clean out any other debris in the wells and charging case.



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### Sanitize AirPods

1. Place AirPods on a clean surface.
2. Clean the surface of each AirPods with an IPA wipe.  
**Important:** Avoid getting any liquid on the microphone and speaker meshes and ports marked in the image below.



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# iPhone 6 and Later Accessories

## Accessories included with iPhone 7 and later:

- Apple 5W USB Power Adapter
- EarPods with Lightning Connector
- Lightning to 3.5 mm Headphone Jack Adapter
- Lightning to Micro USB Adapter (some countries)
- Lightning to USB Cable (1 m)

## Accessories included with iPhone 6, 6 Plus, 6s, 6s Plus:

- Apple 5W USB Power Adapter
- EarPods with 3.5 mm Headphone Plug
- Lightning to Micro USB Adapter (some countries)
- Lightning to USB Cable (1 m)

## Additional accessories (not included):

- Lightning to USB Cable (0.5 m)
- Lightning to USB Cable (2 m)
- Lightning to 30-pin Adapter
- Lightning to 30-pin Adapter (0.2 m)
- Lightning Digital AV Adapter
- Lightning to VGA Adapter
- Lightning to SD Card Camera Reader
- Lightning to USB Camera Adapter
- Lightning to USB 3 Camera Adapter
- iPhone Lightning Dock
- Leather Case\*
- Silicone Case\*
- [iPhone 6 / 6s Smart Battery Case](#)
- [iPhone 7 Smart Battery Case](#)
- [AirPods](#)

\*Service strategy for leather and silicone cases: Leather and silicone cases are available as out-of-warranty service parts. Refer to [SM268: Visual/Mechanical Inspection \(VMI\) Guide for Apple Cases and Covers](#) to identify conditions that may affect warranty coverage.

## Apple 5W USB Power Adapter

- Ultracompact design
- Fast, efficient charging



## EarPods

- Built-in remote to adjust volume, control music and video playback, and answer or end calls
- Designed to rest comfortably inside a variety of ear sizes
- Speakers inside are designed to minimize sound loss and maximize sound output





### Lightning to USB Cable

- USB 2.0
- Connects iPhone, iPad, or iPod (with Lightning connector) to a computer's USB port to sync and charge, or to a USB Power Adapter to charge from a wall outlet
- Reversible design



### Lightning to 3.5 mm Headphone Jack Adapter

- Connects devices that use a 3.5 mm audio plug to a Lightning device
- Compatible with iPhone 5 and later using iOS 10 or later



### Lightning to Micro USB Adapter

- Connects iOS devices with a Lightning connector to micro USB cables and chargers to sync and charge device



### Lightning to 30-pin Adapter

- Connects devices with a Lightning connector to many 30-pin accessories\*
- Supports analog audio output and USB audio, as well as syncing and charging
- Does not support video output

\*Some 30-pin accessories are not supported.



### Lightning to 30-pin Adapter (0.2 m)

- Connects devices with a Lightning connector to many 30-pin accessories\*
- Supports analog audio output, USB audio, syncing, and charging
- Does not support video output

\*Some 30-pin accessories are not supported.



### Lightning Digital AV Adapter

- Supports mirroring of a device's screen to an HDMI-equipped TV, display, projector, or other compatible display in up to 1080p HD
- Requires an HDMI cable (sold separately) for connection to a TV or projector
- Supports both video and audio output



### Lightning to VGA Adapter

- Supports mirroring of a device's screen to a VGA-equipped TV, display, projector, or other compatible display in up to 1080p HD
- Requires a VGA cable (sold separately) for connection to a TV or projector
- Does not support audio output



### Lightning to SD Card Camera Reader

- Downloads photos and videos from a digital camera
- Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
- Compatible with iPhone 5 and later

**Note:** The Lightning to SD Card Camera Reader supports data transfer up to USB 3 speeds on the 10.5-inch and 12.9-inch iPad Pro. All other iOS devices transfer at USB 2 speeds.



### Lightning to USB Camera Adapter

- Downloads photos and videos from a digital camera
- Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
- Compatible with iPhone 5 and later



### Lightning to USB 3 Camera Adapter

- Transfers photos and videos from a digital camera
- Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
- Compatible with iPhone 5 and later

**Note:** The Lightning to USB 3 Camera Adapter transfers data at USB 3 speeds when connected to a 10.5-inch and 12.9-inch iPad Pro. All other iOS devices transfer at USB 2 speeds.



### iPhone Lightning Dock

- Connects iPhone to a computer to sync and charge, or to the Apple USB Power Adapter to charge from a wall outlet using a Lightning to USB Cable
- Features audio port that supports 3.5 mm headphones with remote control or line out
- Available in a variety of colors

- Compatible with iPhone 5 and later



### Leather Case

- Leather exterior with soft microfiber lining
- Available in two sizes and a variety of colors



### Silicone Case

- Silicone exterior with soft microfiber lining
- Available in two sizes and a variety of colors



# AirPods Overview and Visual/Mechanical Inspection (VMI) Guide

This article contains the following sections:

- Overview
- Service Considerations
- AirPods Charging Case Button Functions
- Functional Test
- Visual/Mechanical Inspection
- Troubleshooting

## Overview

### AirPods



- Seamless switching between devices
- AirPods are compatible with the following products:
  - iPhone, iPad, and iPod touch with iOS 10 or later
  - Apple Watch with watchOS 3 or later
  - Mac with macOS Sierra or later
  - Apple TV (4th generation) and Apple TV 4K
  - Products from other manufacturers

Refer to [HT208718: Set up AirPods with your Mac and other Bluetooth devices](#) for more information.

### AirPods Charging Case

- Built-in battery
- Charges AirPods



## Service Considerations

Prior to troubleshooting, refer to [TP320: Cleaning Procedure](#) to clean AirPods and charging case.

For more information about AirPods setup, controls, Siri, and other uses, refer to [HT207010: Connect and use your AirPods](#).

Refer to [HT207974: Get help with your AirPods](#) when troubleshooting an AirPods issues. Search GSX for “AirPods Service Process” for more information on servicing AirPods.

When replacing one or both AirPods, refer to [HT207827: Replace an AirPods or charging case](#) to ensure correct setup of the replacement AirPods.

Do not replace a case for connectivity, pairing, microphone, or audio issues as it will not resolve these issues. The case only

has the following functions:

- Charging
- Entering setup mode
- Resetting AirPods

Only replace a case to resolve the following issues:

- Known-good AirPods will not charge in the case
- Charging case does not hold a charge
- Status light does not function
- Reset button will not enter setup mode or reset AirPods

Configure AirPods on the connected iPhone by tapping the “i” in Settings > Bluetooth for the following functions:

- Double-tap
  - Siri
  - Play or pause
  - Next track
  - Previous track
  - Off
- Automatic Ear Detection
  - On or off
- Microphone
  - Automatically switch AirPods
  - Always left AirPod
  - Always right AirPod

Different charging case status light colors indicate the following circumstances:

- Flashing white when in setup mode
- Flashing amber when AirPods in the case are not connected to each other
- Amber when charging
- Green when fully charged
- No light when the case has been plugged into a charger for longer than six hours

Each AirPod contains a battery. It is possible for each AirPod to have different charge levels.

		Green	Amber
<b>Charging case connected to a charger</b>	Charging case without AirPods inside	Charging case is > 95% charged	Charging case is < 95% charged
	Charging case with AirPods inside	Charging case and both AirPods are > 95% charged	Charging case and/or AirPods are < 95% charged
<b>Charging case not connected to a charger</b>	Charging case without AirPods inside	Charging Case is > 95% charged	Charging Case is < 40% charged
	Charging case with AirPods inside	Both AirPods are > 95% charged	One or both AirPods are < 95% charged

### AirPods Charging Case Button Functions

AirPods must be in the case for these functions.

- Enter discovery mode: Press and hold the charging case button until the status light flashes white. This will allow the AirPods to be paired to a new device or to set up AirPods.
- Restore the AirPods to factory default settings: Press and hold the charging case button for up to 15 seconds until the status light flashes amber. The status light will flash white until the amber light appears.

## Functional Test

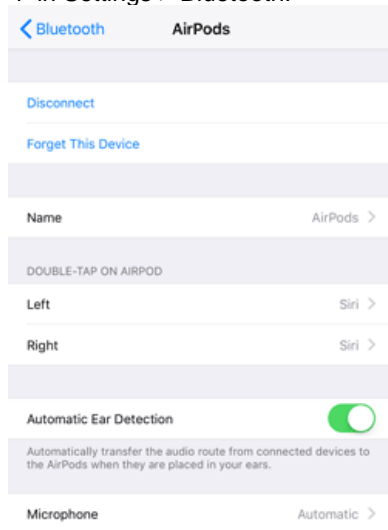
### Pairing and Bluetooth

**Note:** Do not use content from streaming services for the pairing and bluetooth test.

1. Set up AirPods with a known-good device. Open the charging case and press and hold the side button until the status light flashes white, then hold close to an awake known-good device. Follow onscreen instructions.
2. Check Settings > Bluetooth to verify that AirPods are connected. **Note:** The charging case should be open or one or both AirPods should be out of the case.
3. Place AirPods in ears.
4. Listen to music stored on the iPhone to verify proper audio routing.

### Touch Gesture

1. Double-tap either AirPod to access Siri. **Note:** Check the double-tap settings on the connected iPhone by tapping the "i" in Settings > Bluetooth.



### Sound Quality

**Note:** Do not use content from streaming services for the sound quality test.

1. Listen to music stored on the iPhone for sound quality.
2. Set microphone to Always Left AirPod in Settings > Bluetooth.
3. Make a test phone call to an approved toll-free number. During the call, verify the sound quality of the receiver and the microphone.
4. Set microphone to Always Right AirPod and repeat step 3.

### Charging

1. Place both AirPods in the charging case.
2. Connect a Lightning cable to the charging case. Connect the other end of the Lightning cable to a USB power adapter or the USB port on a computer.
3. Verify that the status light on the charging case turns amber (or green, if case and AirPods are both already fully charged; see table above for more information).

## Visual/Mechanical Inspection

### Printing, Mesh, and Sensor Windows

Verify that the printing, mesh, and sensor windows on the AirPods are genuine. Compare printing to known-good AirPods, if available. Verify that the font, size, spacing, alignment, color, contrast, and content is accurate. If known-good AirPods are unavailable for comparison, or there are questions about the authenticity of the printing, escalate to the appropriate team with images of the device being serviced. If the printing, mesh, and sensor windows do not match known-good AirPods, then the AirPods are ineligible for service.



**Known-good printing**



**Known-good mesh**



The white spacers are flush with the metal ring.



**Known-good mesh and sensor window**



**Known-good mesh and sensor window**



### Device Wear

The warranty does not apply to cosmetic damage or to defects caused by normal wear and tear or otherwise due to the normal aging of the device. Cosmetic damage includes, but is not limited to, scratches, dents, and broken plastic on ports. If no hardware issue is present and cosmetic damage is the only reported issue, then deny a repair or replacement.

	Debris or discoloration	Debris or discoloration
Device Wear		

Service Eligibility Guidelines

The chart below outlines the service eligibility of different types of damage.

### Eligible for Warranty Service

If the user is seeking service for an issue described in the Eligible for Warranty Service (green) section, then the device is eligible for replacement under warranty service regardless of the presence of accidental damage.

- **Swollen battery:** Including deformation or case separation due to a swollen battery.

### Eligible for Out-of-Warranty Service (Returnable Damage)

If the user is seeking service for damage (or combination of damages) described in the Eligible for Out-of-Warranty Service (yellow) section, then the device is eligible for out-of-warranty service.

- **Damaged Lightning connector:** Foreign material that cannot be removed, including broken accessories, bent pins, broken plastic, or a bent bezel.

**Cracks**



**Dents**



**Liquid damage or corrosion**



**Liquid damage or corrosion**



### Ineligible for Service (Nonreturnable Damage)

If the user is seeking service for damage described in the Ineligible for Service (red) section, then the device is ineligible for service. Return the device to the user.

- **Disassembled unit or missing parts:** To receive service, the unit must have all functional parts and must be assembled.
- **Counterfeit parts and damage caused by counterfeit parts, third-party parts, or unauthorized modifications:** Damage caused by unauthorized modifications is ineligible for warranty or out-of-warranty service.
- **Catastrophic damage:** Includes units that are destroyed or forcibly separated into multiple pieces.



## Accessories

- [Accessory Issues](#)
- [Missing or Lost Audio Accessory](#)

## Connectivity

- [Control Issues](#)
- [Wireless Connection Issues](#)

## Mechanical

- [Physical Damage Issues](#)
- [Unusual Heat or Odor](#)

## Power

- [Power Issues](#)

## Sound

- [Microphone Issues](#)
- [Sound Issues](#)

# Additional iPhone Resources

## **iPhone Product Page**

iPhone features and technology.

[www.apple.com/iphone](http://www.apple.com/iphone)

## **iPhone Support Page**

Information, guides, assistance, and troubleshooting tips.

[www.apple.com/support/iphone](http://www.apple.com/support/iphone)

## **iPhone Tech Specs**

System requirements, supported languages, media formats, and technical details.

[support.apple.com/specs/iphone](http://support.apple.com/specs/iphone)

## **iPhone User Guide**

Easy-to-access, in-depth usage instructions for features and settings.

[support.apple.com/manuals/iphone](http://support.apple.com/manuals/iphone)

## **iTunes Support Page**

[www.apple.com/support/itunes](http://www.apple.com/support/itunes)

## **Apple Batteries**

[www.apple.com/batteries](http://www.apple.com/batteries)

# Apple Pay Demo (Retail in Apple Pay countries)

The Apple Pay demo only tests the functionality of Apple Pay hardware in Apple Watch and iPhone 6 and later. It does not affect cards or bank accounts connected to Apple Pay.

## Perform the following steps to run the Apple Pay demo:

1. Launch the EasyPay app.
2. Select Apple Pay Demo.
3. Hold the Apple Watch or the top of the iPhone near the back of the Isaac above the PIN pad display. If you are testing an Apple Watch, then double-click the side button to activate Apple Pay.
4. Ask the user to authorize Apple Pay. **Note:** This will not charge the user's card.

## Results:

- If the EasyPay app displays a green check mark, then the hardware is functioning correctly.
- If the EasyPay app displays "No Response," then retest. The hardware or software may not be functional, or a compatible card may not have been set up on the device.
- If the Isaac sled displays the "Card Not Accepted Swipe Card" error message and the EasyPay app displays "No Response," then the device hardware or software may not be functional.
- If the EasyPay app displays a red X, then confirm that other point-of-sale (POS) transactions in the store are completing successfully and try a different Isaac. If POS transactions are completing successfully and you are still seeing this error on another Isaac, then the hardware or software may not be functional. The Apple Pay demo requires fully functional POS systems.

Refer to the following articles to continue troubleshooting:

- [IT1149: Apple Watch: Apple Pay Issues](#)
- [IT1145: iPhone 6 and 6 Plus: Apple Pay Issues](#)
- [IT1211: iPhone 6s, 6s Plus, and SE: Apple Pay Issues](#)
- [IT1398: iPhone 7, 7 Plus, 8, 8 Plus, X, Xs, Xs Max: Apple Pay Issues](#)



# Contactless Payment Reader

The Apple Pay test only verifies the functionality of Apple Pay hardware in Apple Watch and iPhone 6 and later. It does not affect cards or bank accounts connected to Apple Pay.

## Perform the following steps to run the Apple Pay test:

1. Connect the contactless payment reader to an open USB port on a computer.
2. Hold the Apple Watch or top of the iPhone near the contactless payment reader. If you are testing an Apple Watch, double-click the side button to activate Apple Pay.
3. Ask the user to authorize Apple Pay. **Note:** This will not charge the user's card.

## Results

- If the user authorizes Apple Pay: The contactless payment reader will beep and its light will turn green, indicating that the hardware is functional.
- If the user does not authorize Apple Pay: The light on the contactless payment reader will stay red and the iPhone will continue to request authorization, indicating that the hardware is functional.

If neither of the above results occurs, then the hardware may not be functional. Refer to the following articles to continue troubleshooting:

- [IT1150: Apple Watch: Apple Pay Issues](#)
- [IT1144: iPhone 6 and 6 Plus: Apple Pay Issues](#)
- [IT1210: iPhone 6s, 6s Plus, and SE: Apple Pay Issues](#)
- [IT1398: iPhone 7, 7 Plus, 8, 8 Plus, X, Xs, Xs Max: Apple Pay Issues](#)

# iPhone USB Microscope Camera Setup

The Microinspection Procedure requires the USB Microscope tool (661-7382).

## Setup and Use

**Important:** Do not use the supplied installation CD.

**Note:** The live video shown in Photo Booth may be inversed if effect is not applied, or if the Photo Booth Camera Flip package was not downloaded and installed.

1. Download the PhotoBoothCameraFlip.pkg at [SD119: Camera Flip Effect Installation Package for USB Microscope Tool](#).
2. Open the Photo Booth Camera Flip Installer and follow the onscreen instructions.
3. Open the USB Microscope box and unpack the USB Microscope. **Note:** Remove the protective lens cap from microscope before use.
4. Plug the USB Microscope into an available USB port on a workstation computer.
5. Open Photo Booth.
6. In Photo Booth, select Camera in the top menu bar.
7. Choose Venus USB2.0 Camera.
8. Click the Effects button.
9. Choose the last page of effects, select Flip.
10. If the Shutter button in the center (below the live video) is not red, click it.
11. When you are ready to take a picture, click the red Shutter button.

## USB Microscope Overview

**Note:** Snapshot Button will not work with Photo Booth. Click the Shutter button in Photo Booth to take a picture.

1. LED Light Control Wheel
2. Snapshot Button
3. Focus Wheel
4. Magnification Ruler





# Common Troubleshooting Procedures

When troubleshooting, attempt the common troubleshooting procedures in the order listed in the table below. Click the name of a quick fix procedure for detailed information.

## Important:

- The following steps may not be effective for all issues. Apply only the steps necessary to isolate and resolve the user's issue.
- Before servicing a device, ensure that the customer has disabled Find My iPhone in Settings. Refer to [HT201365: Find My iPhone Activation Lock](#) for more information.

Procedure	Action
<b>Update to Latest Software</b>	<p>Go to Settings &gt; General &gt; Software Update, if available; or</p> <p>Use the latest version of iTunes (<a href="http://www.apple.com/itunes/download">www.apple.com/itunes/download</a>) to check for the latest iOS. Connect the device to the computer, open iTunes, select the device, click Summary, then click the Check for Update button.</p>
<a href="#">Charge Battery</a>	<p>Connect to a known-good power outlet, using a known-good Apple USB Power Adapter and Lightning to USB Cable to charge the battery. Do not use a computer port or wireless charging to charge.</p> <p><b>Note:</b> The device may have entered a deep discharge state that requires 20 to 30 minutes of charging to turn on. The charging screen should be visible after two minutes of charging.</p>
<a href="#">Force an App to Close</a>	<p>iPhone 8 and earlier, iPad, and iPod touch:</p> <ol style="list-style-type: none"><li>1. Double-click the Home button to see the App Switcher.</li><li>2. Swipe the app's preview screen up to close the app.</li></ol> <p>iPhone X and later:</p> <ol style="list-style-type: none"><li>1. Swipe up from the bottom of the screen to see the App Switcher.</li><li>2. Touch and hold the app preview screen until the minus button appears.</li><li>3. Tap the minus button or swipe the app's preview screen up to close the app.</li></ol>

<a href="#">Restart</a>	<p>A restart forces the device to close all open files and turns off all hardware components.</p> <p>For all devices using iOS 11 or later:</p> <ol style="list-style-type: none"> <li>1. Choose Settings &gt; General &gt; Shut Down.</li> <li>2. Drag your finger across the slider to turn off the device.</li> <li>3. To turn on the device, press and hold the Sleep/Wake or side button until the Apple logo appears.</li> </ol> <p>iPhone 8 and earlier, iPad, and iPod touch:</p> <ol style="list-style-type: none"> <li>1. Press and hold the Sleep/Wake or side button until a slider appears.</li> <li>2. Drag the slider to turn off the device.</li> <li>3. To turn on the device, press and hold the Sleep/Wake or side button until the Apple logo appears.</li> </ol> <p>iPhone X and later:</p> <ol style="list-style-type: none"> <li>1. Press and hold the Volume Down button and the side button until a slider appears.</li> <li>2. Drag the slider to turn off the device.</li> <li>3. To turn on the device, press and hold the side button until the Apple logo appears.</li> </ol>
<a href="#">Reset</a>	<p><b>Perform a reset only if you are unable to do a restart.</b></p> <ul style="list-style-type: none"> <li>• iPhone 6s or earlier, iPad, and iPod touch: Press and hold the Sleep/Wake button and Home button until the Apple logo appears.</li> <li>• iPhone 7: Press and hold the side button and Volume Down button until the Apple logo appears.</li> <li>• iPhone 8 and later: Press the Volume Up button. Then press the Volume Down button. Then press and hold the side button until the screen goes black. Finally, press and hold the side button until the Apple logo appears.</li> </ul>
<a href="#">Erase All Content and Settings*</a>	Erases all user content and settings, including installed apps. From the Home screen, choose Settings > General > Reset > Erase All Content and Settings. If possible, try this before a restore because it is much faster.
<a href="#">Restore*</a>	Erases all software and data and reinstalls iOS. Connect the device to the computer, open iTunes, select the device, click Summary, then click the Restore button.
<a href="#">Recovery Mode Restore*</a>	Recovery mode loads only the firmware drivers necessary for iTunes to recognize the device. Click the link at left for instructions.

**\*Caution:** Procedures will delete all user data and settings on the device. If saving content is important to the user, a backup should be made before beginning this process. If restoring user data from either an iCloud or iTunes backup causes an issue to return, there is no reason to restore from the other backup method as it will lead to the same result.

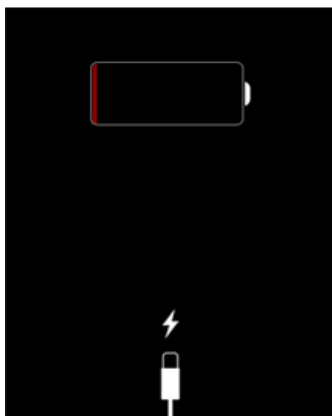
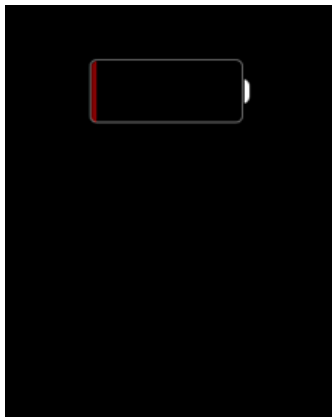
DF Reset and DFU Restore are not necessary to troubleshoot iOS devices. Restore and Recovery Mode Restore take less time to accomplish the same result. If the device will not go into Recovery Mode or will not charge, then follow the troubleshooting steps in the Service Guide.

# Charge Battery

The device must have sufficient battery charge to proceed with troubleshooting. A low battery charge can cause many issues.

If the device has any of the following symptoms, connect it to an Apple 10W or 12W USB Power Adapter to charge for at least 10 minutes:

- Will not turn on
- Black screen
- Charging screen
- Low battery charge



**Note:** If the device is extremely low on power, the display may be blank for up to two minutes before a low-battery images appears. An Apple USB Power Adapter delivers more power than the USB ports of some computers, so the power adapter is the recommended initial charging method for a low battery. Once the device has started up to the iOS, it can be disconnected from the power adapter and connected to a computer.


If troubleshooting or testing will be performed without the device connected to power, make sure the device has a sufficient charge before continuing.

## Important:

- Before connecting any cable to the dock connector, Lightning connector, or headphone jack, check the ports for debris, contamination, corrosion, liquid, or damage. Clean or remedy these issues before connecting any cables.
- If the device becomes too hot while charging, disconnect and replace the device.
- Only use a known-good Apple USB Power Adapter with an Apple Lightning to USB Cable when charging from a power outlet. While other power adapters may appear to be compatible, their lower power output is not sufficient to charge the device.
- The battery icon in the status bar shows the battery charging status and approximately how much charge is left in the battery. When the device is connected to a power source, a lightning bolt appears beside the battery icon.



**Note:** An iPad may take longer to charge while syncing or in use. If the iPad is connected to a source that does not provide sufficient power to charge the device, a “Not Charging” message appears next to the battery icon in the status bar.


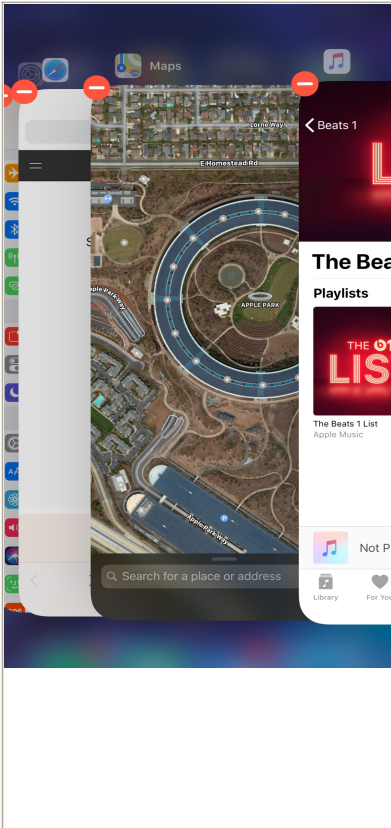

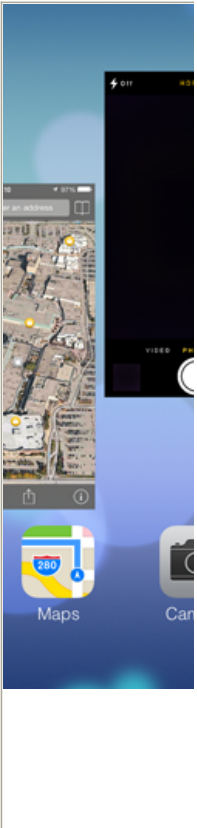
Not Charging 

Refer to the following articles for more information:

- [HT201569: If your iPhone, iPad, or iPod touch won't charge](#)
- [HT201264: About the battery usage on your iPhone, iPad, and iPod touch](#)
- [www.apple.com/batteries](#)

## Force an App to Close

The following procedure forces an app that is nonresponsive or not performing as expected to close. Forcing an app to close is a recommended first troubleshooting step.

<b>iPhone X and later running iOS 12:</b>  <ol style="list-style-type: none"> <li>1. Swipe up from the bottom of the screen to see the App Switcher.</li> <li>2. Swipe up on the app.</li> </ol>	<b>iPhone X running iOS 11:</b>  <ol style="list-style-type: none"> <li>1. Swipe up from the bottom of the screen to see the App Switcher.</li> <li>2. Tap and hold the app until the minus button appears.</li> <li>3. Tap the minus button or swipe up on the app.</li> </ol>	<b>iPhone with Home button running iOS 7 or later:</b>  <ol style="list-style-type: none"> <li>1. Double-click the Home button to see the App Switcher.</li> <li>2. Swipe up on the app.</li> </ol>	
iOS 12	iOS 11	iOS 9 and 10	iOS 7
			

Refer to the following articles for more information:

- [HT201330: How to force an app to close on your iPhone, iPad, or iPod touch](#)
- [HT202070: Switch apps on your iPhone, iPad, or iPod touch](#)
- [HT201398: If an app you installed unexpectedly quits, stops responding, or won't open](#)

# Restart

Restarting iPhone saves user data, closes all open applications, turns off all hardware components, and then restarts the device.

A restart can quickly resolve a wide range of issues, including the following issues:

- Apps unexpectedly quit.
- Battery life is shorter than expected.
- Hardware is not performing as expected.
- Interface or apps are slow to respond.
- iTunes does not recognize or sync with the device.

## Procedure

For devices running iOS 11:

1. Choose Settings > General > Shut Down.
2. Drag your finger across the slider to turn off the device.
3. Turn on the device by pressing and holding the Sleep/Wake button or side button until the Apple logo appears.

iPhone 8 and earlier, iPad, and iPod touch:

1. Press and hold the Sleep/Wake button or side button until a slider appears.
2. Drag your finger across the slider to turn off the device.
3. Turn on the device by pressing and holding the Sleep/Wake button or side button until the Apple logo appears.

iPhone X and later:

1. Press and hold the Volume Down button and the side button until a slider appears.
2. Drag your finger across the slider to turn off the device.
3. Turn on the device by pressing and holding the side button until the Apple logo appears.

**Note:** If the device is unresponsive and won't restart, [reset](#) the device.

# Reset

If the device is unresponsive and will not restart, try to reset it.

**Important:** Reset the device only if it will not restart.

## Key Points

- Resetting the device removes all power for a fraction of a second to turn off the device.
- Resetting the device does not close open files or save data before the device turns off.
- **Caution:** Resetting the device can potentially cause file or operating system damage, requiring a restore.

## Procedure

Perform the following step to reset iPhone 6s and earlier, iPad, and iPod touch:

- Press and hold the Sleep/Wake button and Home button simultaneously until the Apple logo appears.

Perform the following step to reset iPhone 7:

- Press and hold the Side button and Volume Down button simultaneously until the Apple logo appears.

Perform the following steps to reset iPhone 8 and later:

1. Press the Volume Up button.
2. Press the Volume Down button.
3. Press and hold the Side button until the screen goes black.
4. Press and hold the Side button until the Apple logo appears.

# Erase All Content and Settings

Erasing all content and settings is a quick way to restore the device to factory settings. Erase All Content and Settings can resolve software issues more quickly than a time-consuming restore, but it will not reinstall iOS like a restore does.

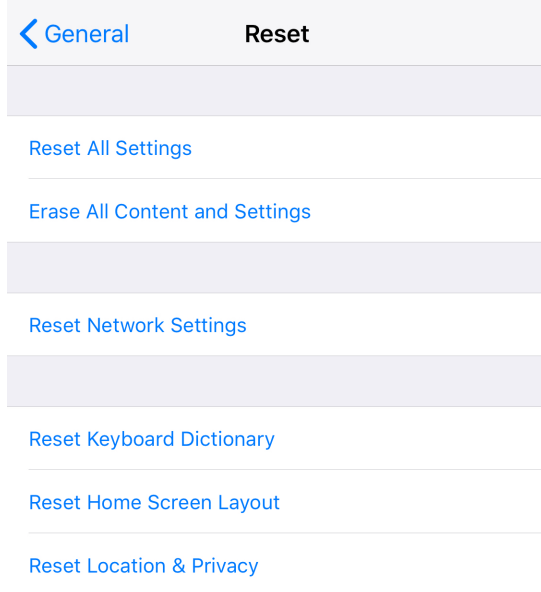


**Caution:** Erasing all content and settings will delete all user data and settings on the device.

**Important:** Before servicing a device, ensure that the user has disabled Find My iPhone in Settings. Refer to [HT201365: Find My iPhone Activation Lock](#) for more information.

## Procedure:

1. Choose Settings > General > Reset > Erase All Content and Settings.



See [HT201274: How to erase your iPhone, iPad, or iPod touch](#).

If erasing all content and settings does not resolve the issue, proceed with a [Restore](#).



# Restore

A restore completely erases the device and installs the latest version of iOS.



**Caution:** Restoring the device will delete all user data and settings.

**Important:** Before servicing a device, ensure that the customer has disabled Find My iPhone in Settings. Refer to [HT201365: Find My iPhone Activation Lock](#) for more information.

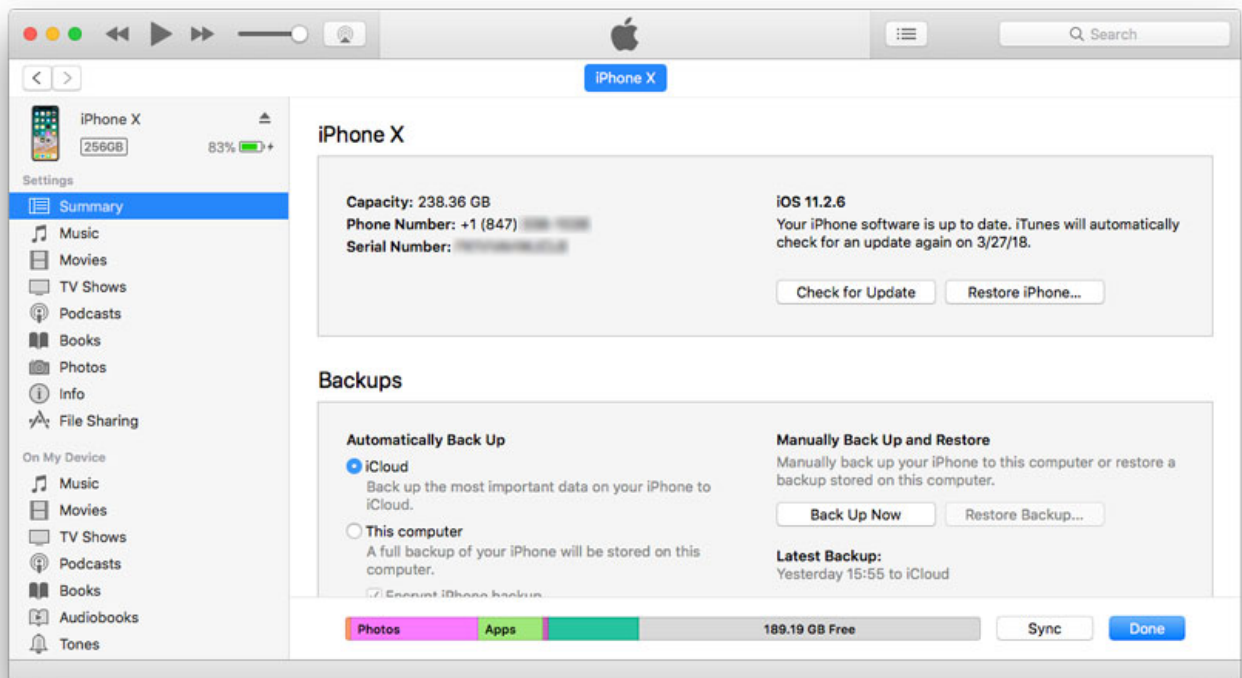
## Key Points:

- A restore erases all user content, settings, and iOS files, and then reinstalls only iOS.
- A restore is time-consuming, especially if you have to download the restore package.
- If iTunes displays an alert with an error code, refer to the following articles:
  - [HT204770: Get help with iOS update and restore errors](#)
  - [HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod](#)
- When the restore is complete, test the device before restoring a backup or syncing content. Refer to the following articles:
  - [HT204136: About backups for iOS devices](#)
  - [HT203977: How to back up your iPhone, iPad, and iPod touch](#)

**Note:** Do not set up the device as a new device, as this can erase previous backups. Copy or rename the backup folder before proceeding. Refer to [HT201252: Restore your iPhone, iPad, or iPod to factory settings](#).

## Procedure:

1. Connect the device to a computer running the latest version of iTunes.
2. Open iTunes, select the device, click Summary, then click the Restore iPhone button.



# Recovery Mode Restore

If iTunes cannot detect the device or a specific restore error appears, check the cable connections. If the issue persists, force the device into recovery mode.



**Caution:** Forcing the device into recovery mode will delete all user data and settings on the device.

If you cannot restore the device, even when using recovery mode, discuss service and replacement options with the user.

**Note:** If the device is connected to iTunes, updating the software may resolve an issue without erasing settings and content. If updating the software does not work, it may be necessary to restore the device, which will erase all settings and content.

**Important:** Before servicing a device, ensure that the user has disabled Find My iPhone in Settings. Refer to [HT201365: Find My iPhone Activation Lock](#) for more information.

## Key Points

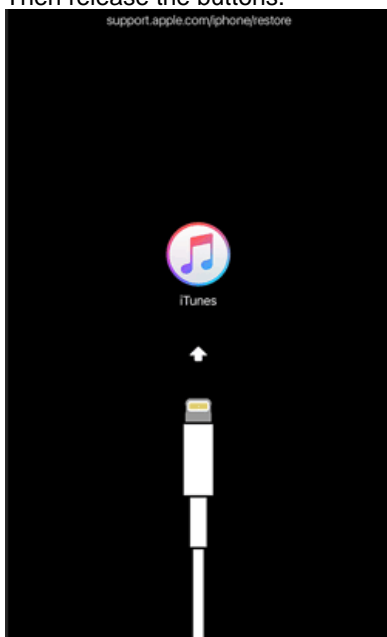
- Recovery mode loads only the firmware drivers necessary for iTunes to recognize the device.
- If iTunes displays an error code alert, then refer to the following articles:
  - [HT204770: Get help with iOS update and restore errors](#)
  - [HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod](#)

**Note:** In certain situations, a device will automatically enter recovery mode after an update or restore issue. If the device is already in recovery mode, then attempt to restore the device using iTunes.

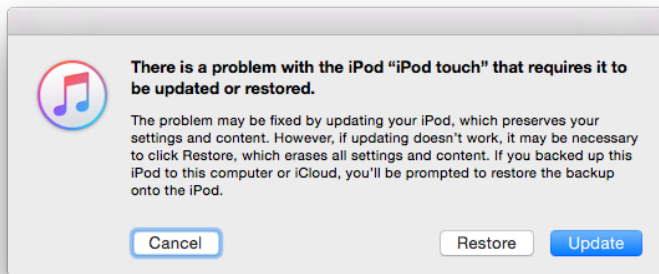
## Procedure

Perform the following steps to place the device into recovery mode. If the device is already in recovery mode, connect the device to a computer and start at step 4.

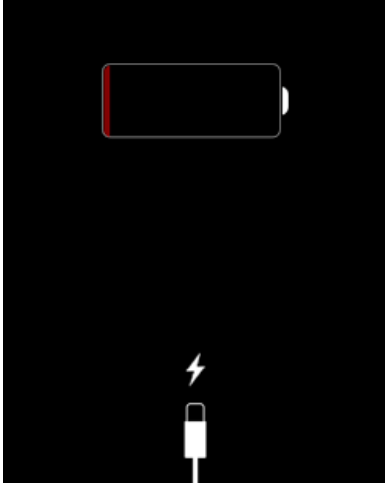
1. Connect the device to a computer and open iTunes.
2. Restart the device.
  - **iPhone 8 or later:** Press the Volume Up button. Press the Volume Down button. Then press and hold the side button until the recovery mode screen appears.
  - **iPhone 7 and iPhone 7 Plus:** Press and hold the side button and Volume Down button at the same time until the recovery mode screen appears.
  - **iPhone 6s and earlier, iPad, and iPod touch:** Press and hold the Home and the top (or side) buttons at the same time until the recovery mode screen appears.
3. Do not release the buttons when the Apple logo appears. Hold the buttons until the recovery mode screen appears. Then release the buttons.



4. Use iTunes to update or restore the device. Updating the device may preserve the data on the device. All data will be lost if you restore the device.



If the Connect to Power screen appears, let the device charge for at least 10 minutes to ensure that the battery has some charge, then repeat step 2.



If the Connect to iTunes screen does not appear, repeat steps 1 through 4. If the Connect to iTunes screen appears but the device does not appear in iTunes, refer to [HT204095: If iTunes doesn't recognize your iPhone, iPad, or iPod](#).

If you decide not to do a restore, you may be able to exit recovery mode by resetting the device.

If you are unable to restore the device, see the appropriate service guide for additional troubleshooting.

# Accessory Does Not Function

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>“This accessory is not made to work with iPhone” message when Made for iPhone accessory or no accessory is connected.</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Verify that the accessory’s package has a “Made for iPhone” label and not a “Made for iPod” or “Made for iPad” label. Refer to <a href="#">HT201619: About iPhone, iPad, and iPod accessories</a>.</li><li>Verify that the device is securely connected to the accessory and not loose, slanted, or partially connected.</li><li>Try the Lightning connector in both orientations.</li><li>Refer to <a href="#">HT203284: If you need help with iPhone, iPad, or iPod touch accessories</a>.</li><li>Restart the device. If the device does not restart, try to reset it.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify the software by connecting the device to iTunes.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.  <b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.  Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
		No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).  Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod, and AirPods: Cleaning Procedures</a> to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Check the following articles to verify that the user's accessory is compatible with the user's device:</p> <ul style="list-style-type: none"> <li>• <a href="#">TP1196: Accessories</a></li> <li>• <a href="#">HT201619: About iPhone, iPad, and iPod accessories</a></li> </ul> <p>Is the user's accessory compatible with the user's device?</p>	Yes	Go to step 5.	\$(nodeText.yesSymptomCode)	
		No	Issue resolved. Advise the user to purchase the correct accessory.	\$(nodeText.noSymptomCode)	
5.	<p>Connect the user's accessory to the user's device.</p> <p>Test accessory functionality.</p>	Yes	Issue resolved by cleaning the device.	\$(nodeText.yesSymptomCode)	
	Does the accessory function properly?	No	Go to step 6.	\$(nodeText.noSymptomCode)	
6.	<p>Substitute a known-good similar accessory, if available, and connect it to the user's device.</p> <p>Test accessory functionality.</p> <p>Does the accessory function properly?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
		No	If the user has a third-party accessory, refer to manufacturer for support. Go to step 7.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
7.	<p>Follow the steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 9.	\$(nodeText.yesSymptomCode)	
		No	Go to step 8.	\$(nodeText.noSymptomCode)	
8.	<p>Follow the steps in the following articles to attempt to restore the device:</p> <ul style="list-style-type: none"> <li>• <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a></li> <li>• <a href="#">HT204770: Get help with iOS update and restore errors</a></li> </ul> <p>Did restore complete?</p>	Yes	Go to step 9.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
9.	<p>Substitute a known-good similar accessory, if available, and connect it to the user's device.</p> <p>Retest accessory functionality.</p> <p>Does the accessory function properly?</p>	Yes	Go to step 10.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE

	Check	Result	Action	Code	Commodity
10.	<p>Connect the user's accessory to the user's device.</p> <p>Retest accessory functionality.</p> <p>Does the accessory function properly?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>If the user has a third-party accessory, refer to the manufacturer for support.</p>	B09	IPHONE ACCESSORY

# TV and Video Output Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<p>When using video output adapter, such as Lightning Digital AV Adapter or Lightning to VGA Adapter, the following symptoms may occur:</p> <ul style="list-style-type: none"><li>• Unable to display device content on TV</li><li>• Unable to display device content on projector</li><li>• Unable to mirror content</li><li>• No audio over HDMI when mirroring using GarageBand or iMovie</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>1. Refer to <a href="#">HT202044: About Apple Digital AV Adapters for iPhone, iPad, and iPod touch</a> to verify that the user's device and video output adapter accessory are compatible and supported.</li><li>2. On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>3. Try the Lightning connector in both orientations.</li><li>4. Verify that the cables are plugged into the appropriate input jacks and correct input is selected on TV or projector.</li><li>5. Restart the device. If the device does not restart, try to reset it.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	`\${nodeText.noSymptomCode}`	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	



	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod, and AirPods: Cleaning Procedures</a> to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test video playback functionality on the user's device.</p> <p>Connect the user's device to the TV or projector with the user's adapter and cable.</p> <p>Test adapter functionality.</p> <p>Does the adapter function properly?</p>	Yes	Issue resolved by cleaning the device.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 5.	`\${nodeText.noSymptomCode}`	
5.	<p>Substitute a known-good similar adapter and cable, if available, and connect it to the user's device.</p> <p>Test adapter functionality.</p> <p>Does the adapter function properly?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
		No	Go to step 6.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
6.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 7.	`\${nodeText.noSymptomCode}`	
7.	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
8.	<p>Substitute a known-good similar adapter and cable, if available, and connect it to the user's device.</p> <p>Retest adapter functionality.</p> <p>Does the adapter function properly?</p>	Yes	Go to step 9.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE

	Check	Result	Action	Code	Commodity
9.	Retest adapter functionality.  Does the adapter function properly?	Yes	Issue resolved by restoring the device to the latest version of iOS.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.  If the user has a third-party video adapter, refer to manufacturer for support.	B09	IPHONE ACCESSORY

# Apple Pay Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>• Unable to set up Apple Pay on device</li><li>• Unable to make contactless payment using Apple Pay on device</li><li>• Unable to make in-app payment using Apple Pay on device</li><li>• Apple Pay stopped functioning</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <p><b>Important:</b> For Japanese devices, have the user remove all Suica cards from Apple Pay before proceeding with service.</p> <p><b>Note:</b> If the user's issue is specific to the Home button not responding when pressed, select "Home Button Issues" from the troubleshooting menu. If the user's issue is specific to Touch ID or Face ID functionality, select "Touch ID Issues" or "Face ID Issues" from the troubleshooting menu. The following procedure is intended for Apple Pay issues only.</p> <ol style="list-style-type: none"><li>1. Verify that the user's device is compatible with Apple Pay.</li><li>2. Verify that the user's payment card is eligible for Apple Pay.</li><li>3. Verify that the user's device has Internet access to complete Apple Pay setup. Internet access is not required for Apple Pay operation.</li><li>4. Have the user delete and then reenroll the same payment card to the device to verify if the issue is with the card or the device.</li></ol> <p><b>Important:</b> Apple Pay card enrollment and authorization process can take up to several hours depending on network conditions.</p> <p>Refer to the following articles for more information about Apple Pay:</p> <ul style="list-style-type: none"><li>• <a href="#">HT208733: If you see a Cellular Update Failed or Apple Pay Not Available alert after iOS update or restart</a></li><li>• <a href="#">HT201469: About Apple Pay</a></li><li>• <a href="#">HT204916: Apple Pay participating banks in Canada, Latin America, and the United States</a></li><li>• <a href="#">HT206637: Apple Pay participating banks in Europe and the Middle East</a></li><li>• <a href="#">HT206638: Apple Pay participating banks and card issuers in Asia-Pacific</a></li><li>• <a href="#">HT204506: Set up Apple Pay</a></li><li>• <a href="#">HT205630: Get help adding cards to Apple Pay</a></li><li>• <a href="#">HT205583: Manage the cards that you use with Apple Pay</a></li><li>• <a href="#">HT201239: Using Apple Pay in stores, within apps, and on the web</a></li><li>• <a href="#">HT203027: Apple Pay security and privacy overview</a></li></ul>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.  <b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.  Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 2.	`\${nodeText.noSymptomCode}`	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).  Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	
3.	Isolate the user's Apple Pay issue to one of the following scenarios:  <ul style="list-style-type: none"> <li>A - The user attempted to make a contactless payment using Apple Pay.</li> <li>B - The user attempted to make an in-app purchase using Apple Pay.</li> </ul> Which issue is relevant?	A	Go to step 4.	`\${nodeText.yesSymptomCode}`	
		B	Go to step 11.	`\${nodeText.noSymptomCode}`	
4.	Run AST 2 MRI on the user's device to check the Secure Element chip.  The Secure Element chip is a crucial component of Apple Pay functionality.  Does the device pass all tests?	Yes	Go to step 6.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 5.	`\${nodeText.noSymptomCode}`	
5.	Restart device. If the device does not restart, try to reset it.  Rerun AST 2 MRI on the user's device.  Does the device pass all tests?	Yes	Go to step 6.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 7.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
6.	<p>Follow steps in the following articles to test Apple Pay NFC hardware functionality on the user's device:</p> <p><a href="#">TP1257: Contactless Payment Reader</a> or <a href="#">TP1282: Apple Pay Demo (Retail in Apple Pay countries)</a></p> <p>Assure the user that the test only checks the functionality of the Apple Pay hardware within the device. The test will not affect cards or bank accounts connected to Apple Pay.</p>	Yes	<p><b>ESCALATION REQUIRED.</b></p> <p>Issue cannot be duplicated.</p> <p>Contact ACS for additional support.</p>	B5J	
		No	Go to step 7.	\${nodeText.noSymptomCode}	
	Does the device pass all tests?				
7.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p>	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
		No	Go to step 8.	\${nodeText.noSymptomCode}	
	Did restore complete?				
8.	<p>Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p>	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
	Did restore complete?				
9.	<p>Rerun AST 2 MRI on the user's device.</p>	Yes	Go to step 10.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5J	IPHONE
	Does the device pass all tests?				

	Check	Result	Action	Code	Commodity
10.	<p>Follow steps in the following articles to test Apple Pay NFC hardware functionality on the user's device:</p> <p><a href="#">TP1257: Contactless Payment Reader</a> or <a href="#">TP1282: Apple Pay Demo (Retail in Apple Pay countries)</a></p> <p>Assure the user that the test checks the functionality of the Apple Pay hardware within the device only. And will not affect cards or bank accounts connected to Apple Pay.</p> <p>Does the device pass all tests?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5J	IPHONE
11.	<p>Run AST 2 MRI on the user's device to check the Secure Element chip.</p> <p>The Secure Element chip is a crucial component of Apple Pay functionality.</p> <p>Does the device pass all tests?</p>	Yes	<p><b>ESCALATION REQUIRED.</b></p> <p>Issue cannot be duplicated.</p> <p>Contact ACS for additional support.</p>	B5J	
		No	Go to step 12.	\$(nodeText.noSymptomCode)	
12.	<p>Restart device. If the device does not restart, try to reset it.</p> <p>Rerun AST 2 MRI on the user's device.</p> <p>Does the device pass all tests?</p>	Yes	<p><b>ESCALATION REQUIRED.</b></p> <p>Issue cannot be duplicated.</p> <p>Contact ACS for additional support.</p>	B5J	
		No	Go to step 13.	\$(nodeText.noSymptomCode)	
13.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 15.	\$(nodeText.yesSymptomCode)	
		No	Go to step 14.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
14.	Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	Yes	Go to step 15.	`\${nodeText.yesSymptomCode}`	IPHONE
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	
15.	Rerun AST 2 MRI on the user's device.  Does the device pass all tests?	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	IPHONE
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5J	



# Bluetooth Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Bluetooth accessory not pairing</li><li>Bluetooth accessory not recognized</li><li>Bluetooth option grayed out in Settings</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Verify that the Bluetooth accessory's package has a "Made for iPhone" label. Refer to <a href="#">HT201619: About iPhone, iPad, and iPod accessories</a>.</li><li>Refer to <a href="#">HT204091: Pair a third-party Bluetooth accessory with your iPhone, iPad, or iPod touch</a> for more information on using Bluetooth accessories with iPhone.</li><li>Refer to <a href="#">HT204387: Supported Bluetooth profiles</a> to verify that specific Bluetooth functionality is supported.</li><li>Follow steps in <a href="#">HT201205: If you can't connect a Bluetooth accessory to your iPhone, iPad, or iPod touch</a>.</li><li>If the user's issue involves pairing the device with a car stereo, follow steps in <a href="#">HT203412: If you can't pair or connect your iPhone, iPad or iPod touch to your car stereo</a>.</li><li>Go to Settings &gt; Bluetooth and tap the slider twice to verify that you can turn Bluetooth off and on.</li><li>If the device is in a case, remove the case. Retest to verify if the case is causing signal interference.</li><li>Go to Settings &gt; Airplane Mode and turn it on. Wait 15 seconds, then turn it off. This will reset all wireless connections on the device. Retest.</li><li>Restart the device. If the device does not restart, try to reset it.</li><li>Reset Bluetooth accessory to delete all paired devices. Refer to the accessory user manual for instructions to reset and unpair the accessory.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	<code>\${nodeText.yesSymptomCode}</code>	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	<code>\${nodeText.noSymptomCode}</code>	

	Check	Result	Action	Code	Commodity
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	Is the device eligible for out-of-warranty service?	No	Return device to user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	
3.	Run AST 2 MRI on the user's device.	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
	<p>Check diagnostic results to verify the presence of Bluetooth hardware.</p> <p><b>Note:</b> You may need to update the user's device to the latest operating system to run AST 2 MRI. Do not restore the user's device before running AST 2 MRI.</p> <p><b>Warning:</b> Verify user has a backup or has given consent before proceeding.</p> <p>If AST 2 is not available, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Bluetooth functionality.</p> <p>Does MRI detect Bluetooth?</p>	No	Go to step 5.	`\${nodeText.noSymptomCode}`	
4.	Attempt to pair the device with a known-good Bluetooth accessory. Test for accessory functionality.	Yes	Issue resolved. Bluetooth accessory is not functioning as expected. Refer user to Bluetooth accessory manufacturer for support.	`\${nodeText.yesSymptomCode}`	
	Does device function as expected with a known-good Bluetooth accessory?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B47	IPHONE

	Check	Result	Action	Code	Commodity
5.	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: Recovery Mode Restore</a> .  <b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.  Did restore complete?	Yes	Go to step 7.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 6.	`\${nodeText.noSymptomCode}`	
6.	Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	Yes	Go to step 7.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
7.	Run AST 2 MRI on the user's device.  Check diagnostic results to verify the presence of Bluetooth hardware.  If AST 2 is not available, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Bluetooth functionality.  Does MRI detect Bluetooth?	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B47	IPHONE

# Cannot Play Media

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Song, video, or other media stored on device will not play on device.</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Restart the device. If the device does not restart, try to reset it.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify by connecting the device to iTunes.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	
3.	Determine whether the media was purchased from the iTunes Store or synced directly from the user's computer.	iTunes	Go to step 4.	\$(nodeText.yesSymptomCode)	
	<p>Was the media purchased from the iTunes Store or synced from the user's computer?</p>	User's Computer	Go to step 5.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
4.	Download known-good media (for example, a free app or song) to the device to reset the encryption key.	Yes	Issue resolved.	\$(nodeText.yesSymptomCode}	
	Attempt to play original media that previously would not play.  Does original media now play?	No	Go to step 6.	\$(nodeText.noSymptomCode}	
5.	Restart device and resync media from the user's computer.	Yes	Issue resolved.	\$(nodeText.yesSymptomCode}	
	Attempt to play original media that previously would not play.  Does original media now play?	No	Go to step 6.	\$(nodeText.noSymptomCode}	
6.	Go to Settings > General > Reset > Erase All Content and Settings.  <b>Warning:</b> Erasing all content and settings on the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	Yes	Issue resolved by erasing all content and settings.	\$(nodeText.yesSymptomCode}	
	Attempt to play known-good media on the device.  Does known-good media play?	No	Go to step 7.	\$(nodeText.noSymptomCode}	
7.	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: Recovery Mode Restore</a> .	Yes	Go to step 9.	\$(nodeText.yesSymptomCode}	
	<b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.  Did restore complete?	No	Go to step 8.	\$(nodeText.noSymptomCode}	
8.		Yes	Go to step 9.	\$(nodeText.yesSymptomCode}	
	Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
9.	Attempt to play known-good media on device.  Does known-good media play?	Yes	Issue resolved by restoring the device to the latest version of iOS.	\${nodeText.yesSymptomCode}	
		No	<b>ESCALATION REQUIRED.</b>  Contact ACS for additional support.	\${nodeText.noSymptomCode}	

# Cellular Call and Text Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"> <li>• Calls are dropped</li> <li>• Cannot make or receive calls</li> <li>• Cannot send or receive text messages</li> <li>• User cannot be heard during telephone calls</li> <li>• No signal strength indicators seen on user's device</li> <li>• "No Service" message displayed on user's device</li> <li>• No cellular connection for calls</li> <li>• Searching for cellular signal</li> <li>• Signal strength shown on users's device is always very weak</li> <li>• Weak or slow cellular connection</li> <li>• Poor, low, or distorted sound during telephone calls</li> </ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <p><b>Note:</b> If the user cannot be heard during a telephone or speakerphone call, even while using wired or Bluetooth headphones, then return to the service guide table of contents and select "Microphone Issues" from the troubleshooting section.</p> <ol style="list-style-type: none"> <li>1. If the device is in a case, remove the case. Retest to verify if the case is causing signal interference.</li> <li>2. Follow steps in <a href="#">HT201415: If you see No Service or Searching on your iPhone or iPad</a> to verify that cellular service is turned on. If the user is traveling internationally, then make sure the user's device is set up for data roaming.</li> <li>3. Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test cellular connectivity functionality.</li> <li>4. Run the Call Performance diagnostic suite in AST 2. Check diagnostic results to obtain call statistics and other device details that may be useful during troubleshooting.</li> <li>5. Follow the steps in the following articles: <ul style="list-style-type: none"> <li>• <a href="#">HT204168: If you can't make a FaceTime call on your iPhone, iPad, or iPod touch</a></li> <li>• <a href="#">HT208733: If you see a Cellular Update Failed or Apple Pay Not Available alert after iOS update or restart</a></li> <li>• <a href="#">HT201673: About cellular data networks</a></li> <li>• <a href="#">HT201287: Use Messages on your iPhone, iPad, or iPod touch</a></li> <li>• <a href="#">HT204065: If you can't send or receive messages on your iPhone, iPad, or iPod touch</a></li> <li>• <a href="#">HT201436: Set up Visual Voicemail on your iPhone</a></li> </ul> </li> <li>6. Go to Settings &gt; Airplane Mode and turn it on. Wait 15 seconds, then turn it off. This will reset all wireless connections on the device. Retest.</li> <li>7. Restart the device. If the device does not restart, try to reset it.</li> <li>8. If there are no cellular signal strength indicators visible on the status bar, then move to another location and check for a better signal.</li> <li>9. On the device, go to Settings &gt; General &gt; About to look for a carrier settings update. See <a href="#">HT201270: Update your carrier settings on your iPhone or iPad</a>.</li> <li>10. Check the coverage maps for the users carrier. Make sure there is proper coverage in the testing area. And make sure there is proper coverage in the area where the user experiencing their issue.</li> <li>11. On the device, go to Settings &gt; General &gt; Software Update to verify that the device has most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li> <li>12. Remove the user's SIM card and examine it. If the SIM appears to be cut down from a larger size, inform the user that cut SIM cards should not be used with this device. iPhone requires an unmodified SIM. Cut SIMs may cause cellular issues.</li> </ol>



	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.  <b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.  Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).  Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return device to user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	On the user's device, go to Settings > General > About.  Check the Modem Firmware section to see if it is blank.  If Modem Firmware is blank, it could confirm a symptom of "No cellular connection."  Is Modem Firmware blank?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B08	IPHONE
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Go to Settings > General > Reset > Reset Network Settings.  <b>Warning:</b> Resetting network settings will erase all stored Wi-Fi passwords. Get consent from the user before proceeding.  Is the cellular call/text issue resolved?	Yes	Issue resolved by resetting network settings.	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	Identify whether the device uses a CDMA or GSM network.  Is the device using a CDMA or GSM network?	CDMA	Go to step 10.	\${nodeText.yesSymptomCode}	
		GSM	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Go to Settings > Phone > SIM PIN.	Yes	Issue resolved.	`\${nodeText.yesSymptomCode}`	
	<p>If the SIM is locked, unlock it. See <a href="#">HT201529: Use a SIM PIN for your iPhone or iPad</a>.</p> <p>Did unlocking the SIM resolve the cellular call/text issue?</p>	No	Go to step 7.	`\${nodeText.noSymptomCode}`	
7.	Use the SIM removal tool to eject the SIM card tray and reseat the SIM card.	Yes	Issue resolved.	`\${nodeText.yesSymptomCode}`	
	Did reseating the SIM card resolve the cellular call/text issue?	No	Go to step 8.	`\${nodeText.noSymptomCode}`	
8.	Install user's SIM card into a known-good phone.	Yes	Go to step 13.	`\${nodeText.yesSymptomCode}`	
	Did installing the user's SIM card into a known-good phone resolve the cellular call/text issue?	No	Go to step 9.	`\${nodeText.noSymptomCode}`	
9.	Use a different phone to call the carrier and verify that the user's account is active.	Yes	Issue resolved.	`\${nodeText.yesSymptomCode}`	
	Did contacting the carrier resolve the cellular call/text issue?	No	Go to step 13.	`\${nodeText.noSymptomCode}`	
10.	Contact the carrier and ask the following questions:	Yes	Issue resolved.	`\${nodeText.yesSymptomCode}`	
	<ul style="list-style-type: none"> <li>Is the account active?</li> <li>Is there an account block related to incompatible plans?</li> <li>Are there any billing related issues or blocks?</li> <li>Are there any feature restrictions on the account?</li> <li>Are there any server side logs accessing or using the network?</li> <li>Is there any localized outage information?</li> <li>Is there a specific resolution to a particular event in the customer's area?</li> </ul> <p>Perform any updates suggested by the carrier.</p> <p>Did this resolve the cellular call/text issue?</p>	No	Go to step 11.	`\${nodeText.noSymptomCode}`	
11.	Contact carrier to move the customer's account to a known-good, unlocked, test iPhone.	Yes	Go to step 13.	`\${nodeText.yesSymptomCode}`	
	Did this resolve the cellular call/text issue?	No	Go to step 12.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
12.	<p>Contact the carrier to determine if the test phone was properly set up and whether there are any network errors that could cause the customer's issue on the test or original iPhone.</p> <p>Is the cellular call/text issue resolved on the test phone?</p>	Yes	Go to step 13.	\$(nodeText.yesSymptomCode)	
		No	<p>The issue is not related to the user's iPhone hardware.</p> <p>Advise the user to contact the wireless carrier for further support.</p>	\$(nodeText.noSymptomCode)	
13.	<p>Go to Settings &gt; General &gt; Reset &gt; Erase All Content and Settings.</p> <p><b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did erasing all content and settings on the device resolve the cellular call/text issue?</p>	Yes	Issue resolved by erasing all content and settings.	\$(nodeText.yesSymptomCode)	
		No	Go to step 14.	\$(nodeText.noSymptomCode)	
14.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 16.	\$(nodeText.yesSymptomCode)	
		No	Go to step 15.	\$(nodeText.noSymptomCode)	
15.	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 16.	\$(nodeText.yesSymptomCode)	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B0J	IPHONE

	Check	Result	Action	Code	Commodity
16.	Determine whether the device has returned to normal operation after restoring it.	Yes	Issue resolved by restoring the device to the latest version of iOS.	\${nodeText.yesSymptomCode}	
	Did restoring the device resolve the cellular call/text issue?	No	Go to step 17.	\${nodeText.noSymptomCode}	
17.	<p>Determine which of the following symptoms was observed on the user's device.</p> <p>The following symptoms indicate "No Cellular Connection":</p> <ul style="list-style-type: none"> <li>No signal strength indicators are visible on the user's device</li> <li>"No Service" shown in the status bar</li> <li>No cellular connection for calls or data</li> <li>"Searching" shown in the status bar</li> </ul>	No Cellular Connection	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B08	IPHONE
	<p>The following symptoms indicate "Weak Connection":</p> <ul style="list-style-type: none"> <li>Calls dropped during call</li> <li>Calls dropped when making or receiving calls</li> <li>The signal strength shown on the user's device is always very weak</li> <li>Weak or slow cellular connection for calls or data</li> <li>Poor, low, or distorted sound during telephone calls</li> </ul> <p>Which symptom describes the issue?</p>	Weak Connection	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7B	IPHONE

# Cellular Data Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"> <li>• Cannot load webpages</li> <li>• Cannot send or receive email</li> <li>• Cannot send or receive cellular data while using apps such as Maps, Weather, and Stocks</li> </ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"> <li>1. If the device is in a case, remove the case. Retest to verify if the case is causing signal interference.</li> <li>2. Follow steps in <a href="#">HT201415: If you see No Service or Searching on your iPhone or iPad</a> to verify that cellular data is turned on. If the user is traveling internationally, then make sure the user's device is set up for data roaming.</li> <li>3. Follow the steps in the following articles: <ul style="list-style-type: none"> <li>• <a href="#">HT204168: If you can't make a FaceTime call on your iPhone, iPad, or iPod touch</a></li> <li>• <a href="#">HT208733: If you see a Cellular Update Failed or Apple Pay Not Available alert after iOS update or restart</a></li> <li>• <a href="#">HT201673: About cellular data networks</a></li> <li>• <a href="#">HT201287: Use Messages on your iPhone, iPad, or iPod touch</a></li> <li>• <a href="#">HT204065: If you can't send or receive messages on your iPhone, iPad, or iPod touch</a></li> </ul> </li> <li>4. Go to Settings &gt; Airplane Mode and turn it on. Wait 15 seconds, then turn it off. This will reset all wireless connections on the device. Retest.</li> <li>5. Restart device. If the device does not restart, try to reset it.</li> <li>6. If there are no cellular signal strength indicators visible on the status bar, then move to another location and check for a better signal.</li> <li>7. If the issue is with email, then verify that the user's email account settings are accurate. Refer to <a href="#">HT201419: If you can't send or receive emails on your iPhone, iPad, or iPod touch</a>.</li> <li>8. CDMA only: Update the Preferred Roaming List (PRL) on the phone by taking the following steps: <ul style="list-style-type: none"> <li>• Sprint: Dial ##update# and tap Send</li> <li>• Verizon: Dial *228, Tap Send, choose option 2.</li> </ul> </li> <li>9. On the device, go to Settings &gt; General &gt; About to look for a carrier settings update. If an update is available, refer to <a href="#">HT201270: Update your carrier settings on your iPhone or iPad</a>.</li> <li>10. Check the coverage map for the customer's carrier. Make sure there is proper coverage in your testing area. And make sure there is proper coverage in the area where the customer is experiencing their issue.</li> <li>11. On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify by connecting the device to iTunes.</li> <li>12. Remove the user's SIM card and examine it. If the SIM card appears to be cut down from a larger size, inform the user that cut SIM cards should not be used with this device. iPhone requires the proper nano-SIM card. Cut SIM cards may cause cellular issues.</li> </ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.  <b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.  Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\$_{nodeText.yesSymptomCode}	
		No	Go to step 2.	\$_{nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).  Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\$_{nodeText.yesSymptomCode}	
		No	Return device to user. Due to damage, the device is no longer eligible for support.	\$_{nodeText.noSymptomCode}	
3.	Go to Settings > General > Reset > Reset Network Settings.  <b>Warning:</b> Resetting network settings will erase all stored Wi-Fi passwords. Get consent from the user before proceeding.  Did resetting network settings resolve the cellular data issue?	Yes	Issue resolved by resetting network settings.	\$_{nodeText.yesSymptomCode}	
		No	Go to step 4.	\$_{nodeText.noSymptomCode}	
4.	Go to Settings and complete the following steps:  <ul style="list-style-type: none"> <li>Go to Wi-Fi and turn on Wi-Fi</li> <li>Go to Cellular and turn off Cellular Data</li> <li>Connect to a known-good Wi-Fi network</li> </ul> Launch Maps and verify that a map loads.  Does a map load on the user's device?	Yes	Go to step 5.	\$_{nodeText.yesSymptomCode}	
		No	Return to the service guide table of contents and select "Wi-Fi Issues" from the troubleshooting section.	\$_{nodeText.noSymptomCode}	
5.	Go to Settings and complete the following steps:  <ul style="list-style-type: none"> <li>Go to Wi-Fi and turn off Wi-Fi</li> <li>Go to Cellular and turn on Cellular Data</li> <li>Connect to a known-good cellular data network</li> </ul> Launch Maps and verify that a map loads.  Does a map load on the user's device?	Yes	Issue cannot be duplicated.	\$_{nodeText.yesSymptomCode}	
		No	Go to step 6.	\$_{nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	<p>Check if the issue is isolated to a single app. Review the app settings to adjust cellular-related items.</p> <p>If the issue is with email, then verify that the user's email account settings are accurate. Refer to <a href="#">HT201419: If you can't send or receive emails on your iPhone, iPad, or iPod touch</a>.</p> <p>Is the issue isolated to a single app?</p>	Yes	Return to the service guide table of contents and select "App Issues" from the troubleshooting section.	\$(nodeText.yesSymptomCode)	
		No	Go to step 7.	\$(nodeText.noSymptomCode)	
7.	<p>Identify whether the device uses a CDMA or GSM network.</p> <p>Is the device using a CDMA or GSM network?</p>	CDMA	Go to step 12.	\$(nodeText.yesSymptomCode)	
		GSM	Go to step 8.	\$(nodeText.noSymptomCode)	
8.	<p>Go to Settings &gt; Phone &gt; SIM PIN.</p> <p>If the SIM is locked, unlock it. See <a href="#">HT201529: Use a SIM PIN for your iPhone or iPad</a>.</p> <p>Did unlocking the SIM resolve the cellular data issue?</p>	Yes	Issue resolved.	\$(nodeText.yesSymptomCode)	
		No	Go to step 9.	\$(nodeText.noSymptomCode)	
9.	<p>Use the SIM Removal Tool to eject the SIM card tray. Reseat the SIM card.</p> <p>Did reseating the SIM card resolve the cellular data issue?</p>	Yes	Issue resolved.	\$(nodeText.yesSymptomCode)	
		No	Go to step 10.	\$(nodeText.noSymptomCode)	
10.	<p>Install the user's SIM card into a known-good phone.</p> <p>Did installing the user's SIM card into a known-good phone resolve the cellular data issue?</p>	Yes	Go to step 15.	\$(nodeText.yesSymptomCode)	
		No	Go to step 11.	\$(nodeText.noSymptomCode)	
11.	<p>Use a different phone to call the carrier and verify that the user's account is active.</p> <p>Did this resolve the cellular data issue?</p>	Yes	Issue resolved.	\$(nodeText.yesSymptomCode)	
		No	Go to step 15.	\$(nodeText.noSymptomCode)	



	Check	Result	Action	Code	Commodity
12.	Contact the carrier and ask the following questions: <ul style="list-style-type: none"> <li>Is the account active?</li> <li>Is there an account block related to incompatible plans?</li> <li>Are there any billing related issues or blocks?</li> <li>Are there any feature restrictions on the account?</li> <li>Are there any server side logs accessing or using the network?</li> <li>Is there any localized outage information?</li> <li>Is there a specific resolution to a particular event in the customer's area?</li> </ul> Perform any updates suggested by the carrier.	Yes	Issue resolved.	\${nodeText.yesSymptomCode}	
		No	Go to step 13.	\${nodeText.noSymptomCode}	
13.	Contact the carrier to move the customer's account to a known-good, unlocked test iPhone.  Did this resolve the cellular data issue?	Yes	Go to step 15.	\${nodeText.yesSymptomCode}	
		No	Go to step 14.	\${nodeText.noSymptomCode}	
14.	Contact the carrier to determine if the test phone was properly set up and whether there are any network errors that could cause the customer's issue on the test or original iPhone.  Is the cellular data issue resolved on the test phone?	Yes	Go to step 15.	\${nodeText.yesSymptomCode}	
		No	The issue is not related to the user's iPhone hardware.  Advise the user to contact the wireless carrier for further support.	\${nodeText.noSymptomCode}	
15.	Go to Settings > General > Reset > Erase All Content and Settings.  <b>Warning:</b> Erasing all content and settings on the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	Yes	Issue resolved by erasing all content and settings.	\${nodeText.yesSymptomCode}	
		No	Go to step 16.	\${nodeText.noSymptomCode}	
	Did erasing all content and settings on the device resolve the cellular data issue?				

	Check	Result	Action	Code	Commodity
16.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 18.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 17.	`\${nodeText.noSymptomCode}`	
17.	<p>Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 18.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
18.	<p>Determine whether the device has returned to normal operation after restore.</p> <p>Did restoring the device resolve the cellular data issue?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 19.	`\${nodeText.noSymptomCode}`	
19.	<p>Determine which of the following symptoms was observed on the user's device.</p> <p>The following symptoms indicate "No Cellular Connection:"</p> <ul style="list-style-type: none"> <li>No signal strength indicators are visible on the user's device</li> <li>"No Service" shown in the status bar</li> <li>No cellular connection for calls or data</li> <li>"Searching" shown in the status bar</li> </ul> <p>The following symptoms indicate "Slow Connection:"</p> <ul style="list-style-type: none"> <li>The signal strength shown on the user's device is always very weak</li> <li>Slow cellular data connection</li> </ul> <p>Which symptom describes the issue?</p>	No Cellular Connection	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B08	IPHONE
		Slow Connection	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7B	IPHONE



# iTunes and Sync Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Device not recognized in iTunes</li><li>Device will not sync</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>1. Connect the device using a known-good Lightning cable to a known-good computer running the latest version of iTunes. Verify that the device is recognized in iTunes and has the most up-to-date software.</li></ol> <p><b>Important:</b> If the user's device is running iOS 11.4.1 or later, the following will occur unless you connect the device to iTunes while it is unlocked or in recovery mode, or you enter the device's passcode while it's connected:</p> <ul style="list-style-type: none"><li>• The device will not be recognized in iTunes.</li><li>• The device will not communicate with USB accessories.</li></ul> <p>Attempt to place the device in recovery mode to verify that the device is recognized in iTunes. Refer to <a href="#">TP337: iOS: Recovery Mode Restore</a> for instructions. Refer to <a href="#">HT208857: Using USB accessories with iOS 11.4.1 and later</a> for more information.</p> <ol style="list-style-type: none"><li>2. Verify that the Lightning cable is securely attached to both the device and the computer.</li><li>3. Try the Lightning cable in both orientations.</li><li>4. Try connecting the device to a different USB 2.0 port on the computer (not on the keyboard or an external hub).</li><li>5. Disconnect other USB devices from the computer.</li><li>6. Verify that the device accepts power with a known-good power adapter and cord. If the device does not accept power, return to the service guide table of contents and select "Battery Will Not Charge" from the troubleshooting section.</li><li>7. Restart the device. If the device does not restart, try to reset it.</li><li>8. Restart the computer and reconnect the device.</li><li>9. If the computer is a Windows PC, refer to <a href="#">HT204095: If iTunes doesn't recognize your iPhone, iPad, or iPod</a> and <a href="#">HT203188: Restart the Apple Mobile Device Service (AMDS) on Windows</a>.</li><li>10. Check for third-party software conflicts.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod, and AirPods: Cleaning Procedures to clean the Lightning connector</a>.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Connect the device to the user's computer with the user's Lightning to USB Cable (if available). Check whether the device is recognized in iTunes.</p> <p>If the user's computer or cable is not available, then answer "No" to the following question.</p> <p>Does iTunes recognize the device?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Go to step 9.	\${nodeText.noSymptomCode}	
5.	<p>Attempt to sync the device with iTunes.</p> <p>Was the sync successful?</p>	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Go to Settings > General > Reset > Erase All Content and Settings.	Yes	Issue resolved by erasing all content and settings.	\${nodeText.yesSymptomCode}	
	<p><b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.</p> <p>Attempt to sync the device with iTunes.</p> <p>Was the sync successful?</p>	No	Go to step 7.	\${nodeText.noSymptomCode}	
7.	Restore device in recovery mode using the latest version of iTunes. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	<p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
8.	Attempt to sync the device with iTunes.	Yes	Issue resolved by restoring the device to the latest version of iOS.	\${nodeText.yesSymptomCode}	
	Was the sync successful?	No	<p><b>ESCALATION REQUIRED.</b></p> <p>Contact ACS for additional support.</p>	B0J	
9.	Troubleshooting this issue completely requires a known-good Lightning to USB Cable.	Yes	Go to step 11.	\${nodeText.yesSymptomCode}	
	Do you have immediate access to a known-good Lightning to USB Cable?	No	Go to step 10.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
10.	<p>Inspect the user's Lightning to USB Cable for damage.</p> <p>Did you find any damage to the cable or its components?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
		No	Go to step 12.	\${nodeText.noSymptomCode}	
11.	<p>Substitute a known-good Lightning to USB Cable and retest.</p> <p>Does iTunes recognize the device?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE ACCESSORY
		No	Go to step 12.	\${nodeText.noSymptomCode}	
12.	<p>Connect the device to a known-good computer running the latest version of iTunes and see whether the device is recognized in iTunes.</p> <p>Does iTunes recognize the device?</p>	Yes	<p>User needs to reinstall iTunes. If reinstall is unsuccessful in eliminating the symptom, user needs to troubleshoot the issue with the computer.</p> <p>If the computer is a Windows PC, refer to <a href="#">HT204275: Remove and reinstall iTunes and related software components for Windows 7 and later.</a></p>	\${nodeText.yesSymptomCode}	
		No	Go to step 13.	\${nodeText.noSymptomCode}	
13.	<p>Put the device into recovery mode and reconnect it to a known-good computer. See <a href="#">TP337: iOS: Recovery Mode Restore.</a></p> <p>Verify if device is now recognized in iTunes.</p> <p>Does iTunes recognize the device?</p>	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE





# SIM Card Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>“Invalid SIM card installed” message</li><li>“No SIM card installed” message</li><li>“Different SIM detected. Please connect to iTunes.” message</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, make sure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Inserting a non-Apple authorized carrier SIM card can cause SIM alert messages. Verify that the SIM card is authorized to be used with this particular device.</li><li>Inserting a SIM card that is not the SIM used for the device’s current activation can cause SIM alert messages.</li><li>A “Locked SIM” message in the iPhone status bar means that the SIM is locked and a personal identification number (PIN) is required to unlock. If “Locked SIM” message appears, follow steps in <a href="#">HT201529: Use a SIM PIN for your iPhone or iPad</a>.</li><li>Verify that the correct SIM tray is installed in the user’s device. SIM trays for iOS devices vary slightly in size and shape. Using the incorrect SIM tray may prevent the device from detecting an inserted SIM card. Refer to <a href="#">HT202645: Learn which size SIM card your iPhone or iPad uses</a> and <a href="#">HT201337: Remove or switch the SIM card in your iPhone or iPad</a> for more information.</li><li>Restart the device. If the device does not restart, try to reset it.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
3.	<p>Use the SIM Removal Tool to eject the SIM card tray.</p> <p>Did the SIM tray eject?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Inspect the SIM card tray for damage.</p> <p>Verify that the correct SIM tray is installed in the user's device.</p> <p>SIM trays for iOS devices vary slightly in size and shape. Using the incorrect SIM tray may prevent the device from detecting an inserted SIM card.</p> <p>Refer to <a href="#">HT202645: Learn which size SIM card your iPhone or iPad uses</a> and <a href="#">HT201337: Remove or switch the SIM card in your iPhone or iPad</a> for more information.</p> <p>Does the SIM tray appear damaged or incorrect in size or shape?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	Determine if the device has physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE COMPONENT
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
6.	Remove the user's SIM and examine it. If the SIM appears to be cut down from a larger size, inform the user that cut SIM cards should not be used with this device. iPhone requires the proper nano-SIM card. Cut SIMs may cause cellular issues.	Yes	Issue resolved. Replace SIM card with the correct carrier-supported SIM card.	`\${nodeText.yesSymptomCode}`	
	Does the user's SIM card appear to be cut down from a larger size?	No	Go to step 7.	`\${nodeText.noSymptomCode}`	
7.	Reinstall the user's SIM card. Make sure the SIM card is fully seated in the enclosure.	Yes	Issue resolved by reseating SIM card.	`\${nodeText.yesSymptomCode}`	
	Did reseating the SIM card resolve the SIM card issue?	No	Go to step 8.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
8.	Install the user's SIM card into a known-good phone.  Did the user's SIM work in a known-good phone?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B33	IPHONE
		No	Issue resolved. Replace SIM card with the correct carrier-supported SIM card.	\${nodeText.noSymptomCode}	

# Wi-Fi Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>• Unable to locate nearby Wi-Fi network</li><li>• Unable to connect to Wi-Fi network</li><li>• Unable to access Internet</li><li>• Wi-Fi option grayed out in Settings</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>1. Go to Settings &gt; Wi-Fi and verify that you can turn WI-Fi off and on.</li><li>2. If the device is in a case, remove the case. Retest to verify if the case is causing signal interference.</li><li>3. Check Wi-Fi signal strength. If signal strength is low, move closer to the Wi-Fi router or hotspot.</li><li>4. Follow steps in <a href="#">HT202639: Connect to Wi-Fi on your iPhone, iPad, or iPod touch</a> and <a href="#">HT204051: If your iPhone, iPad, or iPod touch won't connect to a Wi-Fi network</a>. <b>Note:</b> If the network is hidden, you must choose "Other..." and enter the network name to join.</li><li>5. Go to Settings &gt; Wi-Fi and tap the blue circle to the right of the network name. Choose "Forget This Network" and then connect to a known-good Wi-Fi network.</li><li>6. Restart the device. If the device does not restart, try to reset it.</li><li>7. On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>8. If the Wi-Fi option is grayed out or dimmed in Settings, tap General &gt; Reset &gt; Reset Network Settings. All network settings, including Wi-Fi passwords, virtual private network (VPN), and access point name (APN) settings will reset.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
2.	<p>Determine whether the device is eligible for out of warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	
3.	<p>Follow all steps in <a href="#">HT204051: If your iPhone, iPad, or iPod touch won't connect to a Wi-Fi network</a>, including steps to reset network settings on the user's device.</p> <p>Is Wi-Fi issue resolved?</p>	Yes	Issue resolved by resetting network settings.	\$(nodeText.yesSymptomCode)	
		No	Go to step 4.	\$(nodeText.noSymptomCode)	
4.	<p>Run AST 2 MRI diagnostic suite on the user's device.</p> <p>Check diagnostic results to verify the presence of Wi-Fi hardware.</p> <p>If AST 2 is not available, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test Wi-Fi functionality.</p> <p>Does MRI detect Wi-Fi?</p>	Yes	Go to step 5.	\$(nodeText.yesSymptomCode)	
		No	Go to step 6.	\$(nodeText.noSymptomCode)	
5.	<p>Follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test Wi-Fi functionality.</p> <p>Is the device able to join a known-good Wi-Fi network?</p>	Yes	Issue cannot be duplicated.	\$(nodeText.yesSymptomCode)	
		No	Go to step 6.	\$(nodeText.noSymptomCode)	
6.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	\$(nodeText.yesSymptomCode)	
		No	Go to step 7.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
7.	<p>Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
8.	<p>Run AST 2 MRI diagnostic suite on the user's device.</p> <p>Check diagnostic results to verify the presence of Wi-Fi hardware.</p> <p>If AST 2 is not available, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test Wi-Fi functionality.</p> <p>Does MRI detect Wi-Fi?</p>	Yes	Go to step 9.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B45	IPHONE
9.	<p>Follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test Wi-Fi functionality.</p> <p>Is the device able to join a known-good Wi-Fi network?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B45	IPHONE

# Cracked Glass

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Cracked display glass</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Refer to <a href="#">SM252: iPhone Visual/Mechanical Inspection (VMI) Guide for iPhone 6, 6 Plus, 6s, 6s Plus, 7, 7 Plus, 8, 8 Plus, 070-00167</a> or <a href="#">SM271: iPhone Visual/Mechanical Inspection (VMI) Guide for iPhone X, Xs, and Xs Max, 070-01347</a> to determine whether damage is catastrophic.</li></ol> <p><b>Note:</b> A device with catastrophic damage is not eligible for service.</p> <ol style="list-style-type: none"><li>Verify whether this issue appears to be safety related. Refer to <a href="#">HT203291: Addressing cracked iPhone, iPad, iPod touch, or Apple Watch displays</a> and <a href="#">OP44: Handling Potential Product Safety Issues</a> for more information.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Determine whether the device has a crack in the display or the enclosure glass.	Display	Go to step 2.	<code>#{nodeText.yesSymptomCode}</code>	
	Does the device have a crack in the display or enclosure glass?	Enclosure	Go to step 5.	<code>#{nodeText.noSymptomCode}</code>	
2.	Determine whether the device's display has a hairline crack or multiple cracks.	Hairline Crack	Go to step 3	<code>#{nodeText.yesSymptomCode}</code>	
	Select "Hairline Crack" if the display has the following symptoms: <ul style="list-style-type: none"><li>No point of impact</li><li>No spiderweb fracturing</li></ul> Select "Multiple Cracks" if the display has any of the following symptoms: <ul style="list-style-type: none"><li>Multiple cracks</li><li>Spiderweb fracturing</li><li>LCD fractures under the cover glass</li><li>Hairline crack with point of impact</li></ul> Does the device's display have a hairline crack or multiple cracks?	Multiple Cracks	Go to step 4.	<code>#{nodeText.noSymptomCode}</code>	



	Check	Result	Action	Code	Commodity
3.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B98	IPHONE COMP DISPLAY
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B98	IPHONE
4.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B92	IPHONE COMP DISPLAY
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B92	IPHONE

	Check	Result	Action	Code	Commodity
5.	<p>Determine whether the device's enclosure glass has a hairline crack or multiple cracks.</p> <p>Select "Hairline Crack" if the display has the following symptoms:</p> <ul style="list-style-type: none"> <li>• No point of impact</li> <li>• No spiderweb fracturing</li> </ul> <p>Select "Multiple Cracks" if the enclosure glass has any of the following symptoms:</p> <ul style="list-style-type: none"> <li>• Multiple cracks</li> <li>• Spiderweb fracturing</li> <li>• Hairline crack with point of impact</li> </ul> <p>Does the device's enclosure glass have a hairline crack or multiple cracks?</p>	Hairline Crack	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B9H	IPHONE
		Multiple Cracks	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B9J	IPHONE

# Display Anomalies

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Pixel anomalies</li><li>Particles or debris under the glass</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Clean the display with a clean microfiber cloth.</li></ol> <p><b>Important:</b> Do not use liquids, sprays, or abrasives to clean the device.</p>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return device to user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Run the Display Pixel Anomalies diagnostic suite in AST 2 to generate test patterns that help identify display anomalies.</p> <p>Refer to <a href="#">HT202025: About LCD display pixel anomalies for Apple products released in 2010 and later</a> to determine whether the display anomalies qualify the device for display replacement.</p> <p>Do the observed display anomalies qualify the device for display replacement?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Issue cannot be duplicated.	\${nodeText.noSymptomCode}	
4.	<p>Determine if the device has any physical damage that makes this component repair impossible.</p> <p>Is the device eligible for a component repair?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B57	IPHONE COMP DISPLAY
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B57	IPHONE

# Display Rotation Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Screen does not rotate when device changes orientation</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, make sure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information</p> <ol style="list-style-type: none"><li>Verify that Portrait Orientation Lock is off. Check for the rotation lock icon (a circular arrow with a lock inside) in the upper-right-hand corner of the screen. If the icon is visible, follow the steps in <a href="#">HT204547: If the screen doesn't rotate on your iPhone, iPad, or iPod touch</a> to disable it.</li><li>Hold iPhone in an upright position when rotating between portrait and landscape orientation.</li><li>Not all iOS apps are designed to rotate. Some may use only portrait or landscape, or switch depending on the content. Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test display rotation (accelerometer) functionality.</li><li>Restart the device. If the device does not restart, try to reset it.</li><li>On device, go to Settings &gt; General &gt; Software Update to verify device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	`\${nodeText.noSymptomCode}`	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return device to user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
3.	Run AST 2 MRI on the user's device.	Yes	Go to step 4.	\$(nodeText.yesSymptomCode)	
	<p>Check diagnostic results to verify the presence of accelerometer and gyroscope sensor hardware.</p> <p><b>Note:</b> You may need to update the user's device to the latest operating system to run this test. Do not restore the user's device before running AST 2.</p> <p><b>Warning:</b> Verify that the user has a backup or has given consent before proceeding.</p> <p>If AST 2 is not available, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test display rotation (accelerometer) functionality.</p> <p>Does MRI detect accelerometer and gyroscope sensor hardware?</p>	No	Go to step 5.	\$(nodeText.noSymptomCode)	
4.	Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test display rotation (accelerometer) functionality.	Yes	Issue cannot be duplicated.	\$(nodeText.yesSymptomCode)	
	Does the display rotate properly?	No	Go to step 5.	\$(nodeText.noSymptomCode)	
5.	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .	Yes	Go to step 7.	\$(nodeText.yesSymptomCode)	
	<p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	No	Go to step 6.	\$(nodeText.noSymptomCode)	
6.		Yes	Go to step 7.	\$(nodeText.yesSymptomCode)	
	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
7.	Run AST 2 MRI on the user's device.	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	<p>Check diagnostic results to verify the presence of accelerometer and gyroscope sensor hardware.</p> <p>If AST 2 is not available, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test display rotation (accelerometer) functionality.</p> <p>Does MRI detect accelerometer and gyroscope sensor hardware?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5C	IPHONE
8.	<p>Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to retest display rotation (accelerometer) functionality.</p> <p>Does the display rotate properly?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5C	IPHONE

# Multi-Touch and 3D Touch Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Multi-Touch is slow to respond or is not responding</li><li>3D Touch is is not responding</li><li>Isolated areas not responding to Multi-Touch or 3D Touch</li><li>Erratic response to Multi-Touch or 3D Touch</li><li>Unexpected Multi-Touch response</li><li>Overly sensitive Multi-Touch or 3D Touch response</li><li>Insensitivity to 3D Touch response</li><li>Not responding when dragging slider to power off</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Verify that the issue is related to Multi-Touch and not related to the device being unresponsive. View the clock on the Home screen or on the Clock app icon to see if it's keeping time. The second hand on the Clock app icon should move smoothly clockwise around the clock dial. If the clock is not keeping time, this may indicate an unresponsive device. Return to the service guide table of contents and select "Unexpected Freeze/Restart/Power Off, 'Connect to iTunes'" from the troubleshooting section.</li><li>If the issue is related to 3D Touch, then go to Settings &gt; General &gt; Accessibility and confirm that the 3D Touch setting is enabled. <b>Note:</b> Not all iPhone models support 3D Touch. Skip instructions for 3D Touch on iPhone models that do not support it.</li><li>Clean the display with a clean microfiber cloth. <b>Important:</b> Do not use liquids, sprays, or abrasives to clean the device.</li><li>Rule out environmental causes by checking for the use of protective films, cases, gloves, or a stylus. Verify that the user touches the screen with finger pads and not fingernails.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify device has the most up-to-date software. If unavailable, verify by connecting the device to iTunes.</li><li>Quit any apps that are running in the background.</li><li>Restart the device. If the device does not restart, try to reset it.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\$(nodeText.noSymptomCode)	
	Is the device in warranty and eligible for warranty service?				



	Check	Result	Action	Code	Commodity
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).  Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return device to user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>If the symptom is that the user's device is not properly responding to touch, then run the Multi-Touch diagnostic suite in AST 2.</p> <p>If the symptom is that the user's device is exhibiting unexpected touch response or is overly sensitive to touch response, then run the Unexpected Touch diagnostic suite in AST 2.</p> <p>If the symptom is related to 3D Touch, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test 3D Touch functionality.</p> <p>If AST 2 is not available, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Multi-Touch and 3D Touch functionality.</p> <p>Rotate and test the device in all four directions.</p> <p>Did the display respond as expected?</p>	Yes	Issue cannot be duplicated. Remind user that protective films, cases, styluses, gloves, and fingernails can prevent Multi-Touch and 3D Touch from responding properly.	\${nodeText.yesSymptomCode}	
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Isolate the user's issue to Multi-Touch or 3D Touch.  Is the user's issue related to Multi-Touch or 3D Touch?	Multi-Touch	Go to step 5.	\${nodeText.yesSymptomCode}	
		3D Touch	Go to step 7.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	<p><b>Note:</b> Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps:</p> <ol style="list-style-type: none"> <li>1. Open the device.</li> <li>2. Disconnect the group of flex cables connecting the display to the logic board.</li> <li>3. Examine each connector for signs of damage or debris.</li> <li>4. If display flex connectors appear normal and not damaged, reconnect this group of flex cables, gently reseating each connector by lightly pressing on it with two fingers.</li> <li>5. If any display flex cable appears abnormal or damaged, answer “No” to the question below.</li> <li>6. Reassemble by installing any removed components, removing and replacing the display adhesive, and closing the device.</li> </ol>	Yes	Issue resolved by reseating internal display flex cables.	<code>\${nodeText.yesSymptomCode}</code>	
	<p>If the symptom is that the user's device is not properly responding to touch, then run the Multi-Touch diagnostic suite in AST 2.</p> <p>If the symptom is that the user's device is overly sensitive to touch response, then run the Unexpected Touch diagnostic suite in AST 2.</p> <p>If AST 2 is not available, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Multi-Touch and 3D Touch functionality.</p> <p>Rotate and test the device in all four directions.</p> <p>Did the display respond as expected?</p>	No	Go to step 6.	<code>\${nodeText.noSymptomCode}</code>	

	Check	Result	Action	Code	Commodity
6.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B56	IPHONE COMP DISPLAY
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B56	IPHONE
7.	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .	Yes	Go to step 9.	`\${nodeText.yesSymptomCode}`	
	<b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.  Did restore complete?	No	Go to step 8.	`\${nodeText.noSymptomCode}`	
8.		Yes	Go to step 9.	`\${nodeText.yesSymptomCode}`	
	Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
9.	Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test 3D Touch functionality.	Yes	Issue resolved by restoring the device to the latest version of iOS.	\${nodeText.yesSymptomCode}	
	Rotate and test the device in all four directions.	No	Go to step 10.	\${nodeText.noSymptomCode}	
	Did the display respond as expected?				
10.	Isolate the user's 3D Touch symptom to issue A or B.	A	Go to step 12.	\${nodeText.yesSymptomCode}	
	<ul style="list-style-type: none"> <li>• A: <ul style="list-style-type: none"> <li>◦ 3D Touch is not responding</li> <li>◦ Isolated areas not responding to 3D Touch</li> </ul> </li> <li>• B: <ul style="list-style-type: none"> <li>◦ Insensitivity to 3D Touch response</li> <li>◦ Overly sensitive 3D Touch response</li> </ul> </li> </ul>	B	Go to step 11.	\${nodeText.noSymptomCode}	
	Which issue is relevant?				
11.	<b>Note:</b> Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps: <ol style="list-style-type: none"> <li>1. Open the device.</li> <li>2. Remove and replace the display adhesive.</li> <li>3. Close the device.</li> </ol>	Yes	Issue resolved by display adhesive replacement.	\${nodeText.yesSymptomCode}	
	Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test 3D Touch functionality.	No	Go to step 12.	\${nodeText.noSymptomCode}	
	Rotate and test the device in all four directions.				
	Did the display respond as expected after display adhesive replacement?				

	Check	Result	Action	Code	Commodity
12.	Determine if the device has physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B56	IPHONE COMP DISPLAY
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B56	IPHONE

# No Video/Poor Image

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>• No image on device display</li><li>• Distorted video</li><li>• Rainbow effect</li><li>• Poor image quality</li><li>• Nonuniform color</li><li>• Displayed images have incorrect white balance (images have different color hues than expected)</li><li>• Bad contrast</li><li>• Brightness or backlight issues</li><li>• Light bleed</li><li>• Horizontal/vertical lines</li><li>• White screen</li><li>• Blank/Black screen</li><li>• Flickering</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <p><b>Note:</b> This troubleshooting procedure is intended for no video or poor image quality issues only. If the device will not turn on, return to the service guide table of contents and select “No Power” from the troubleshooting section.</p> <ol style="list-style-type: none"><li>1. Clean the display with a clean microfiber cloth. <b>Important:</b> Do not use liquids, sprays, or abrasives to clean the device.</li><li>2. Rule out environmental causes by checking and removing protective films and cases.</li><li>3. Rotate the device to confirm if the issue is caused by media, software, or the display.</li><li>4. Connect the device using a known-good Lightning cable to a known-good computer running the latest version of iTunes. Verify that the device is recognized in iTunes and has the most up-to-date software.</li></ol> <p><b>Important:</b> If the user's device is running iOS 11.4.1 or later, the following will occur unless you connect the device to iTunes while it is unlocked or in recovery mode, or you enter the device's passcode while it's connected:</p> <ul style="list-style-type: none"><li>• The device will not be recognized in iTunes.</li><li>• The device will not communicate with USB accessories.</li><li>• The device will appear to have no power.</li></ul> <p>Attempt to place the device in recovery mode to verify if it can turn on. Refer to <a href="#">TP337: iOS: Recovery Mode Restore</a> for instructions. Refer to <a href="#">HT208857: Using USB accessories with iOS 11.4.1 and later</a> for more information.</p> <ol style="list-style-type: none"><li>5. Go to Settings &gt; Display &amp; Brightness and turn Auto-Brightness off and on, then adjust the brightness level. Recheck the user's device to see if this resolved the issue. Changing the Auto Brightness setting in this way resets all ambient light sensor properties.</li><li>6. If the user reports symptoms related to white balance, refer to <a href="#">TP1445: Night Shift</a>.</li><li>7. Some iPhone models support True Tone display technology. True Tone uses the device's ambient light sensors to adjust the appearance of the displayed image when activated. This can be mistaken as a service issue. Refer to <a href="#">HT202613: Adjust the brightness on your iPhone, iPad, or iPod touch</a> for more information about using brightness settings and True Tone. Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to verify True Tone functionality for iPhone models that support True Tone.</li><li>8. Go to Settings &gt; General &gt; Accessibility &gt; Display Accommodations and verify that Reduce White Point and Color Filters settings are turned off. If these settings are turned on, the altered screen image may incorrectly</li></ol>

	<p>be perceived as a display service issue.</p> <p>9. Plug the device into a known-good 10W or 12W Apple USB power adapter that is connected to AC power until an image appears on the screen, or for up to 10 minutes, whichever comes first. Refer to <a href="#">TP325: Charge Battery</a> for more information. If the device does not charge or no image appears on the screen after 10 minutes of charging, return to the service guide table of contents and select “No Power” from the troubleshooting section.</p> <p>10. Restart the device. If the device does not restart, try to reset it</p>
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## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 2.	`\${nodeText.noSymptomCode}`	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Return device to user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	
3.	<p>Some device failures may prevent AST 2 diagnostic suites from running.</p> <p>Attempt to run the Display Backlight and Color and Display Image Quality suites for the following models:</p> <ul style="list-style-type: none"> <li>• iPhone 7</li> <li>• iPhone 7 Plus</li> <li>• iPhone 8</li> <li>• iPhone 8 Plus</li> <li>• iPhone XR</li> </ul> <p>Attempt to run the Display Color Uniformity and Display Image Quality suites for the following models:</p> <ul style="list-style-type: none"> <li>• iPhone X</li> <li>• iPhone Xs</li> <li>• iPhone Xs Max</li> </ul> <p>Can these tests run on the user's device?</p>	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 5.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
4.	Run the Display Backlight and Color and Display Image Quality suites for the following models:	Yes	Issue cannot be duplicated.	\$(nodeText.yesSymptomCode)	
	<ul style="list-style-type: none"> <li>• iPhone 7</li> <li>• iPhone 7 Plus</li> <li>• iPhone 8</li> <li>• iPhone 8 Plus</li> <li>• iPhone XR</li> </ul>				
	Run the Display Color Uniformity and Display Image Quality suites for the following models:	No	Go to step 5.	\$(nodeText.noSymptomCode)	
	<ul style="list-style-type: none"> <li>• iPhone X</li> <li>• iPhone Xs</li> <li>• iPhone Xs Max</li> </ul>				
	Does the device pass all tests?				
5.	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .	Yes	Go to step 7.	\$(nodeText.yesSymptomCode)	
	<b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	No	Go to step 6.	\$(nodeText.noSymptomCode)	
	Did restore complete?				
6.		Yes	Go to step 7.	\$(nodeText.yesSymptomCode)	
	Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
	Did restore complete?				



	Check	Result	Action	Code	Commodity
7.	Run the Display Backlight and Color and Display Image Quality suites for the following models:	Yes	Issue resolved.	\${nodeText.yesSymptomCode}	
	<ul style="list-style-type: none"> <li>• iPhone 7</li> <li>• iPhone 7 Plus</li> <li>• iPhone 8</li> <li>• iPhone 8 Plus</li> <li>• iPhone XR</li> </ul>				
	Run the Display Color Uniformity and Display Image Quality suites for the following models:	No	Go to step 8.	\${nodeText.noSymptomCode}	
	<ul style="list-style-type: none"> <li>• iPhone X</li> <li>• iPhone Xs</li> <li>• iPhone Xs Max</li> </ul>				
	Does the device pass all tests?				
8.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Go to step 10.	\${nodeText.yesSymptomCode}	
	Is the device eligible for a component repair?	No	Go to step 9.	\${nodeText.noSymptomCode}	
9.	Determine which of the following symptoms is causing the issue:	Image Quality	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B54	IPHONE
	Blank/Black Screen: Device has power and is recognized by iTunes, but display remains black or is completely white.				
	Image Quality: Distorted video, rainbow effect, poor image quality, nonuniform color, bad contrast, brightness or backlight issues, light bleed, horizontal or vertical lines or blocks, out of focus, or flickering.				
	Does the device have image quality or blank/black screen symptom?	Blank/Black Screen	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5H	IPHONE

	Check	Result	Action	Code	Commodity
10.	<p><b>Note:</b> Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps:</p> <ol style="list-style-type: none"> <li>1. Open the device.</li> <li>2. Disconnect the group of flex cables connecting the display to the logic board.</li> <li>3. Examine each connector for signs of damage or debris.</li> <li>4. If display flex connectors appear normal and not damaged, reconnect the group of flex cables, gently reseating each connector by lightly pressing on it with two fingers.</li> <li>5. If any display flex cable appears abnormal or damaged, answer "No" to the question below.</li> <li>6. Reassemble by installing any removed components and closing the device.</li> <li>7. Retest the device display.</li> </ol> <p>Did this resolve the issue?</p>	Yes	Issue resolved by reseating internal display flex cables.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 11.	`\${nodeText.noSymptomCode}`	
11.	<p>Determine which of the following symptoms is causing the issue:</p> <p>Blank/Black Screen: Device has power and is recognized by iTunes, but display remains black or is completely white.</p> <p>Image Quality: Distorted video, rainbow effect, poor image quality, nonuniform color, bad contrast, brightness or backlight issues, light bleed, horizontal or vertical lines or blocks, out of focus, or flickering.</p> <p>Does the device have blank/black screen symptoms or image quality symptoms?</p>	Image Quality	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B54	IPHONE COMP DISPLAY
		Blank/Black Screen	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5H	IPHONE COMP DISPLAY

# Ambient Light Sensor Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Display does not adjust to varying light environments while auto-brightness on.</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Clean the display with a clean microfiber cloth. <b>Important:</b> Do not use liquids, sprays, or abrasives to clean the device.</li><li>Rule out environmental causes by checking and removing protective films and cases.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>Go to Settings &gt; Display &amp; Brightness and turn Auto-Brightness off then on again. Recheck the user's device to see if this resolved the issue.</li><li>Some iPhone models support True Tone display technology. True Tone uses the device's ambient light sensors to adjust the appearance of the displayed image when activated. This can be mistaken as a service issue. Refer to <a href="#">HT202613: Adjust the brightness on your iPhone, iPad, or iPod touch</a> for more information about using Brightness settings and True Tone. Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to verify True Tone functionality for iPhone models that support True Tone.</li><li>Restart the device. If the device does not restart, try to reset it.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
3.	Run AST 2 MRI on the user's device.	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Check diagnostic results to verify the presence of ambient light sensor hardware.				
	<p><b>Note:</b> You may need to update the user's device to the latest operating system to run AST 2 MRI. Do not restore the user's device before running AST 2.</p> <p><b>Warning:</b> Verify that the user has a backup or has given consent before proceeding.</p> <p>If AST 2 is not available, follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test ambient light sensor functionality.</p> <p>Does MRI detect the ambient light sensor?</p>	No	Go to step 5.	\${nodeText.noSymptomCode}	
4.	Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test ambient light sensor functionality.	Yes	Issue cannot be duplicated. Remind the user that protective films and cases can prevent the ambient light sensor from responding properly.	\${nodeText.yesSymptomCode}	
	Did the display respond as expected?	No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B54	IPHONE COMP DISPLAY
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B54	IPHONE

# Burnt Smell and Odor

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Device emits burning, smoky, or other unusual odor</li></ul>	<p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>1. Disconnect the power adapter and all peripherals from the device.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Determine whether this is a safety issue. Refer to <a href="#">OP44: Handling Potential Product Safety Issues</a> .	Yes	<b>ESCALATION REQUIRED.</b>  Contact ACS for safety-related issues. Refer to <a href="#">OP44: Handling Potential Product Safety Issues</a> .	\${nodeText.yesSymptomCode}	
	Do not perform procedures that can be a safety risk to you or the user.  Have you identified a safety issue?	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.  <b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Is the device in warranty and eligible for warranty service?	No	Go to step 3.	\${nodeText.noSymptomCode}	
3.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
4.	Determine the source of the odor.	Device	Go to step 5.	\${nodeText.yesSymptomCode}	
	Is the odor coming from the device or an accessory?	Accessory	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	<p>Test to determine whether the device turns on and functions.</p> <p>Does the device turn on and function?</p>	Yes	<p><b>ESCALATION REQUIRED.</b></p> <p>Contact ACS for additional support.</p>	B0M	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B0M	IPHONE
6.	<p>Advise user to stop using the accessory.</p> <p>Is the accessory made by Apple or a third party?</p>	Apple	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B09	IPHONE ACCESSORY
		Third Party	<p>Refer the user to the accessory manufacturer for support.</p>	\${nodeText.noSymptomCode}	

# Camera Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>• Camera not present on user's device</li><li>• Camera not functioning</li><li>• Cannot take photos</li><li>• Cannot record video</li><li>• Camera LED flash not working</li><li>• No preview visible in Camera app</li><li>• Camera app crashes</li><li>• Camera cannot switch between rear camera and front camera</li><li>• "Face ID has been disabled." message appears on the Home screen or in Settings</li><li>• Photo or video image quality from one or both cameras is not as expected</li><li>• Photos or videos are blurry or fuzzy</li><li>• Photos or videos are too dark or too light</li><li>• Photos or videos contain colored lines or bands</li><li>• Photos or videos contain spots</li><li>• Photos or videos contain incorrect color balance</li><li>• Camera image has a flare, haze, or spot near the edge</li><li>• Images taken with the camera appear to have brightly colored scratches</li><li>• Rear camera has issues switching to the telephoto camera for optical zoom beyond 2x in bright light conditions.</li><li>• Rear camera is unable to focus at infinity</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure that the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>1. Inspect for any signs of damage around the rear camera module. Any damage to the rear camera (such as caused by dropping the device) may cause the image stabilization functionality of this camera to malfunction or produce photos with image quality defects, requiring out-of-warranty service.</li><li>2. If "Face ID has been disabled." message appears on the Home screen or in Settings, follow steps in <a href="#">HT208186: If Face ID is disabled on your iPhone X</a>. Rear camera replacement may resolve this issue.</li><li>3. Verify that a case or protective film is not obstructing the camera or flash. Some ferrous or magnetic material, such as cases and lenses, could interfere with the image stabilization functionality of the rear camera.</li><li>4. Follow steps in <a href="#">HT203040: Get help with the camera on your iPhone, iPad, or iPod touch</a>.</li><li>5. On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>6. If the Camera app is missing, verify that it has not been restricted in Settings &gt; General &gt; Restrictions. The user would need to enter their password to disable the restriction.</li></ol> <p>The Camera app can also be restricted by configuration profiles. Check Settings &gt; General &gt; Device Management to verify that a configuration profile is not preventing use of the camera.</p> <ol style="list-style-type: none"><li>7. Take a photo of the <a href="#">iPhone Camera Test Image</a> with both cameras (front camera and rear camera). Inspect the photos to verify image quality for each camera.</li><li>8. When taking a photo or starting a video recording, the device should play a shutter sound effect. The sound is not played if the Ring/Silent switch is set to silent. If the user's issue is that the camera is not making sound, check that the Ring/Silent switch is set for ring and not silent.</li></ol> <p><b>Note:</b> In some regions, the sound effects for Camera are played even if the Ring/Silent switch is set to silent.</p> <ol style="list-style-type: none"><li>9. Open Camera, choose Video, turn the flash on, then off, then set it to auto to test flash function.</li><li>10. Open Control Center and tap the Flashlight button to turn on two flash LEDs.</li><li>11. Take a photo with the flash on to turn on all flash LEDs.</li><li>12. Refer to <a href="#">HT203692: If you see a flare, haze, or spot near the edge of your photo or video</a> to determine if the user's issue involves these symptoms. If so, then this may be expected behavior and is not a service issue</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 2.	`\${nodeText.noSymptomCode}`	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	
3.	<p>Verify that the user's device has one of the following issues:</p> <ul style="list-style-type: none"> <li>No preview visible in Camera app</li> <li>Camera app crashes</li> <li>Cannot switch between rear camera and front camera</li> <li>"Face ID has been disabled." message on the Home screen or in Settings</li> </ul> <p>Does the user's device exhibit any of the above listed symptoms?</p>	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 9.	`\${nodeText.noSymptomCode}`	
4.	<p>Determine if the device has any physical damage that makes a component repair impossible.</p> <p>Is the device eligible for a component repair?</p>	Yes	Go to step 5.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0A	IPHONE



	Check	Result	Action	Code	Commodity
5.	<p><b>Note:</b> Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps:</p> <ol style="list-style-type: none"> <li>1. Open the device.</li> <li>2. Remove the cowl on the upper right-hand side of the device.</li> <li>3. Disconnect the rear camera flex cable and examine the flex cable and its connector. Examine the rear camera connector on the logic board.</li> </ol> <p>Does the camera flex cable or either connector appear intentionally damaged?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0A	IPHONE
		No	Go to step 6.	\$(nodeText.noSymptomCode)	
6.	<p>Reconnect the camera flex cable, gently reseating the connector completely by lightly pressing on it with two fingers.</p> <p>Reassemble by installing any removed components and closing the device.</p> <p>Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to retest rear camera functionality.</p> <p>After reseating the camera flex cable, is the rear camera working as expected?</p>	Yes	Issue resolved by reseating camera flex cable.	\$(nodeText.yesSymptomCode)	
		No	Go to step 7.	\$(nodeText.noSymptomCode)	
7.	<p>Troubleshooting this issue completely requires a known-good rear camera assembly.</p> <p>Do you have immediate access to a known-good rear camera assembly?</p>	Yes	Go to step 8.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0A	IPHONE

	Check	Result	Action	Code	Commodity
8.	<p>Follow Service Guide instructions to open the user's device and remove the rear camera assembly.</p> <p>Temporarily substitute the known-good rear camera assembly in the user's device.</p> <p>Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to retest both cameras functionality to determine if this resolves these specific symptoms:</p> <ul style="list-style-type: none"> <li>• No preview visible in Camera app</li> <li>• Camera app crashes</li> <li>• Cannot switch between rear camera and front camera</li> <li>• "Face ID has been disabled." message appears on the Home screen or in Settings</li> </ul> <p>Does the known-good rear camera assembly resolve these symptoms?</p>	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p><b>Note:</b> For serial number entry in the repair transaction, use the serial number associated with the smaller (top) camera on the module.</p> <p>After camera replacement, run the AST 2 Camera Image Quality suite to calibrate the rear camera and verify that photos taken appear normal.</p>	B0A	IPHONE COMP CAMERA
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B0N	IPHONE

	Check	Result	Action	Code	Commodity
9.	<p>Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test functionality of both cameras.</p> <p>If available, then run AST 2 MRI on the user's device.</p> <p>Check diagnostic results to verify the presence of front and rear camera hardware.</p> <p><b>Note:</b> You may need to update the user's device to the latest operating system to run this test. Do not restore the user's device before running AST 2.</p> <p><b>Warning:</b> Verify that the user has a backup or has given consent before proceeding.</p> <p>Determine whether the front camera or rear camera is affected.</p> <p>Is the issue related to the front camera or the rear camera?</p>	Front	Go to step 10.	\$_{nodeText.yesSymptomCode}	
		Rear	Go to step 16.	\$_{nodeText.noSymptomCode}	
10.	<p>Determine which of the following front camera symptoms are observed on the device:</p> <p>The following symptoms indicate an image quality issue:</p> <ul style="list-style-type: none"> <li>• Photos or videos are blurry or fuzzy</li> <li>• Photos or videos are too dark or too light</li> <li>• Photos or videos contain colored lines or bands</li> <li>• Photos or videos contain spots</li> <li>• Photos or videos contain incorrect color balance</li> <li>• Images taken with the camera have brightly colored "scratches"</li> </ul> <p>The following symptoms indicate the camera is not functioning:</p> <ul style="list-style-type: none"> <li>• Cannot take photos</li> <li>• Cannot record video</li> <li>• AST 2 MRI does not detect camera hardware</li> </ul> <p>Does the camera have image quality issues or is the camera not functioning?</p>	Image Quality	Go to step 14.	\$_{nodeText.yesSymptomCode}	
		Not Functioning	Go to step 11.	\$_{nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
11.	<p>Follow the steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If restore fails, attempt recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 13.	{nodeText.yesSymptomCode}	
		No	Go to step 12.	{nodeText.noSymptomCode}	
12.	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 13.	{nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
13.	<p>Follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to retest front camera functionality.</p> <p>If available, then run AST 2 MRI on user's device.</p> <p>Check diagnostic results to verify the presence of front and rear camera hardware.</p> <p>Is the camera functioning after restoring the device?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	{nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0N	IPHONE

	Check	Result	Action	Code	Commodity
14.	<p>Verify that the user's device has the following specific issue:</p> <ul style="list-style-type: none"> <li>Images taken with the front camera have brightly colored "scratches" due to a laser beam contacting and damaging the camera sensor.</li> </ul> <p>Damage can be viewed in an image taken with the camera.</p> <p><b>Note:</b> Damage may not be seen in the camera preview.</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0N	IPHONE
	<p>Take a photo of the <a href="#">iPhone Camera Test Image</a> with the front camera. Inspect the photos to locate the damage.</p>	No	Go to step 15.	\${nodeText.noSymptomCode}	
	Does the user's device exhibit this specific symptom?				
15.	<p>Clean the glass around the front camera with a microfiber cloth.</p> <p>Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to retest front camera functionality.</p> <p>Is the camera image quality issue resolved?</p>	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0N	IPHONE

	Check	Result	Action	Code	Commodity
16.	Determine which of the following rear camera symptoms are observed on the device:	Image Quality	Go to step 23.	\$_{nodeText.yesSymptomCode}	
	<p>The following symptoms indicate an image quality issue:</p> <ul style="list-style-type: none"> <li>• Photos or videos are blurry or fuzzy</li> <li>• Photos or videos are too dark or too light</li> <li>• Photos or videos contain colored lines or bands</li> <li>• Photos or videos contain spots</li> <li>• Photos or videos contain incorrect color balance</li> <li>• Images taken with the camera have brightly colored “scratches”</li> </ul>	Not Functioning	Go to step 17.	\$_{nodeText.noSymptomCode}	
	<p>The following symptoms indicate the camera is not functioning:</p> <ul style="list-style-type: none"> <li>• Cannot take photos</li> <li>• Cannot record video</li> <li>• Camera LED flash not working</li> <li>• AST 2 MRI does not detect camera hardware</li> </ul> <p>Does the camera have image quality issues or is the camera not functioning?</p>				
17.	<p>Determine whether the camera or flash is not functioning.</p> <p>Is the camera or flash failing?</p>	Camera	Go to step 18.	\$_{nodeText.yesSymptomCode}	
		Flash	Service required. Proceed with repair creation to see available options.	B5C	IPHONE
18.	<p><b>Note:</b> Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps:</p> <ol style="list-style-type: none"> <li>1. Open device.</li> <li>2. Remove the cowl on the upper right-hand side of the device.</li> <li>3. Disconnect the rear camera flex cable and examine the flex cable and its connector. Examine the rear camera connector on the logic board.</li> </ol> <p>Does the camera flex cable or either connector appear intentionally damaged?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0A	IPHONE
		No	Go to step 19.	\$_{nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
19.	Reconnect the camera flex cable, gently reseating the connector by lightly pressing on it with two fingers.	Yes	Issue resolved by reseating camera flex cable.	\${nodeText.yesSymptomCode}	
	Reassemble by installing any removed components and closing the device.  Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to retest rear camera functionality.  If available, then run AST 2 MRI on user's device.  Check diagnostic results to verify the presence of front and rear camera hardware.  After reseating the camera flex cable, is the rear camera working as expected?	No	Go to step 20.	\${nodeText.noSymptomCode}	
20.	Follow the steps listed in article <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If restore fails, attempt recovery mode restore. See article <a href="#">TP337: iOS: Recovery Mode Restore</a> .	Yes	Go to step 22.	\${nodeText.yesSymptomCode}	
	<b>Warning:</b> Restoring the device will delete all user data. Verify user has a backup or has given consent before proceeding.  Did restore complete?	No	Go to step 21.	\${nodeText.noSymptomCode}	
21.	Follow the steps listed in articles <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	Yes	Go to step 22.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
22.	Follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to retest front camera functionality.	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	
	If available, then run AST 2 MRI on user's device.				
	Check diagnostic results to verify the presence of front and rear camera hardware.	No	Go to step 27.	`\${nodeText.noSymptomCode}`	
23.	Is the camera functioning after restoring the device?				
	Verify that the user's device has the following specific issue:	Yes	Go to step 27.	`\${nodeText.yesSymptomCode}`	
	<ul style="list-style-type: none"> <li>Images taken with the rear camera have brightly colored "scratches" due to a laser beam contacting and damaging the camera sensor.</li> </ul> <p>Damage can be viewed in an image taken with the camera.</p> <p><b>Note:</b> Damage may not be seen in the camera preview.</p>				
24.	Take a photo of the <a href="#">iPhone Camera Test Image</a> with the rear camera. Inspect the photos to locate the damage.	No	Go to step 24.	`\${nodeText.noSymptomCode}`	
	Does the user's device exhibit this specific symptom?				
	Use a microfiber cloth to clean the rear camera lens.	Yes	Issue resolved by cleaning the device.	`\${nodeText.yesSymptomCode}`	
25.	Follow steps listed in <a href="#">TP1045: iPhone Functional Test</a> to retest rear camera functionality.	No	Go to step 25.	`\${nodeText.noSymptomCode}`	
	Is the camera image quality issue resolved?				
	Verify that the user's device exhibits one or both of the following symptoms with the the rear camera:	Yes	Go to step 26.	`\${nodeText.yesSymptomCode}`	
26.	<ul style="list-style-type: none"> <li>Issues zooming beyond 2x in bright light conditions.</li> <li>Unable to focus at infinity.</li> </ul> <p>Does the user's device exhibit either of these symptoms?</p>	No	Go to step 27.	`\${nodeText.noSymptomCode}`	



	Check	Result	Action	Code	Commodity
26.	<p>The rear camera in iPhone X requires occasional calibration to maintain focus accuracy. Refer to the Service Considerations section of <a href="#">TP1596: Overview</a> for more information on rear camera calibration.</p> <p>If the user's device is an iPhone X, run the AST 2 Rear Camera Calibration Suite to attempt to calibrate the rear camera. For other models, skip this step by replying 'no'.</p> <p>Follow these steps when running this calibration:</p> <ol style="list-style-type: none"> <li>1. Check for magnetic material (such as metal table, magnets in case, speakers, other nearby devices) and remove it from the device's vicinity before starting the calibration.</li> <li>2. Ensure the camera application is closed before starting the calibration.</li> <li>3. Ensure the device is not bumped or moved during the calibration.</li> </ol> <p>Check diagnostic results to verify the camera calibration was successful.</p> <p>After AST 2 completes, follow steps in <a href="#">TP1045: iPhone Functional Test</a> to retest rear camera functionality.</p> <p>After calibration, is the rear camera working as expected?</p>	Yes	Issue resolved by calibrating rear camera.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 27.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
27.	<p>Determine if the device has any physical damage that makes a component repair impossible.</p> <p>Is the device eligible for a component repair?</p>	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p><b>Note:</b> For serial number entry in the repair transaction, use the serial number associated with the smaller (top) camera on the module.</p> <p>After camera replacement, run the AST 2 Camera Image Quality suite to calibrate the rear camera (on iPhone X only) and verify that photos taken appear normal.</p>	B0A	IPHONE COMP CAMERA
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B0A	IPHONE

# Face ID Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"> <li>• Unable to read the user's face</li> <li>• Unable to enroll a user's face in settings</li> <li>• Unable to unlock the device with a user's face</li> <li>• Unable to make a purchase with iTunes</li> </ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information,</p> <p><b>Important:</b> If a "Face ID has been disabled." message appears on the Home screen or in Settings, follow steps in <a href="#">HT208186: If Face ID is disabled on your iPhone X</a>. Return to the service guide table of contents and select "Camera Issues" from the troubleshooting section.</p> <p><b>Note:</b> This procedure is intended for Face ID issues only. If the user's issue is specific to the front or rear cameras, return to the service guide table of contents and select "Camera Issues" from the troubleshooting section.</p> <ol style="list-style-type: none"> <li>1. Restart the device. Ask the user to enter their passcode to unlock the device. (Face ID unlocks iPhone only when it wakes from sleep, not after it turns on or restarts.)</li> <li>2. On the device, have the user go to Settings &gt; Face ID &amp; Passcode to verify if their face has been enrolled before performing further troubleshooting. If no face is enrolled, Face ID will be unable to function as expected. Have the user delete and then reenroll their face to verify that enrollment functions as expected.</li> <li>3. Learn more about the technology and security built into Face ID to help identify errors made during enrollment or in how Face ID is used. Refer to the following articles: <ul style="list-style-type: none"> <li>• <a href="#">HT208108: About Face ID advanced technology</a></li> <li>• <a href="#">HT208109: Use Face ID on iPhone X</a></li> <li>• <a href="#">HT208114: Get help with Face ID on your iPhone X</a></li> </ul> </li> <li>4. In Settings &gt; Face ID &amp; Passcode, verify that iPhone Unlock is turned on. If Face ID &amp; Passcode is turned off, Face ID will not unlock the device. Verify that iTunes &amp; App Store is turned on. If iTunes &amp; App Store is turned off, then Face ID cannot be used to make purchases in the iTunes Store, App Store, and iBooks Store.</li> <li>5. Verify the user's issue. Press the side button to lock the device. Then have the user try to unlock the device with their face. After the lock icon unlocks, swipe up from the bottom of the screen to view the Home screen.</li> <li>6. Ensure that the top of the device, including the front camera, is clean. Check for dirt, debris, oils, lotions, or signs of damage. If necessary, clean the front glass on the user's device using a clean microfiber cloth.</li> <li>7. Check for cases or protective films. Remove them if they are obstructing the top of the device, including the front camera, and then retest for Face ID functionality.</li> <li>8. Delete the enrolled face and have the user try to reenroll their face.</li> <li>9. If user's face does not reliably work on their device, try enrolling the user's face on another known-good device.</li> <li>10. Enroll your own face with the user's device and retest for Face ID functionality. <b>Important:</b> Remove any nonuser data from the device when testing is complete so that your information is not left on the user's device</li> </ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
		No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	
3.	<p>Run AST 2 MRI diagnostic suite on the user's device.</p> <p>Check diagnostic results to verify the presence of Face ID hardware.</p> <p><b>Note:</b> You may need to update the user's device to the latest operating system to run AST 2 MRI. Do not restore the user's device before running AST 2.</p> <p><b>Warning:</b> Verify that the user has a backup or has given consent before proceeding.</p> <p>If AST 2 is not available, follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Face ID functionality.</p> <p>Did MRI detect Face ID hardware?</p>	Yes	Go to step 8.	\$(nodeText.yesSymptomCode)	
		No	Go to step 4.	\$(nodeText.noSymptomCode)	
4.	<p><b>Note:</b> Refer to the specific take-apart procedure for your device to perform the following take-apart and reassembly steps:</p> <ol style="list-style-type: none"> <li>1. Open device.</li> <li>2. Disconnect all display and front camera flex cables and examine the flex cables and their connectors. Examine the connectors on the logic board.</li> </ol> <p>Do any of these flex cables or connectors appear damaged?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE
		No	Go to step 5.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
5.	Reconnect all display and front camera flex cables, gently reseating the connectors by lightly pressing on them with two fingers.	Yes	Go to step 6.	\$(nodeText.yesSymptomCode)	
	<p>Reassemble by installing any removed components and closing the device.</p> <p>Run AST 2 MRI diagnostic suite on the user's device.</p> <p>Check diagnostic results to verify the presence of Face ID hardware.</p> <p>If AST 2 is not available, follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Face ID functionality.</p> <p>After reseating these flex cables, did MRI detect Face ID hardware as expected?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE
6.	Run AST 2 Face ID suite on the user's device.	Yes	Go to step 7.	\$(nodeText.yesSymptomCode)	
	<p>Check diagnostic results to verify the functionality of Face ID hardware.</p> <p>Look for the following diagnostic result:</p> <p>Testing completed and no issues were found on this device.</p> <p>If AST 2 is not available, follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Face ID functionality.</p> <p>Did the device pass all tests?</p>	No	Go to step 10.	\$(nodeText.noSymptomCode)	
7.	Repeat Quick Check steps to verify Face ID functionality.	Yes	Issue resolved by reseating cables.	\$(nodeText.yesSymptomCode)	
	<p>If the following issues occur, Face ID is not responding as expected:</p> <ul style="list-style-type: none"> <li>• There are authentication errors or failures on the user's device when attempting to use their face to unlock the device.</li> <li>• Multiple people are having problems enrolling their face.</li> <li>• Registration process cannot begin because the device cannot detect any face.</li> </ul> <p>Is Face ID responding as expected?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE

	Check	Result	Action	Code	Commodity
8.	Run AST 2 Face ID suite on the user's device.	Yes	Go to step 9.	`\${nodeText.yesSymptomCode}`	
	<p>Check diagnostic results to verify the functionality of Face ID hardware.</p> <p>Look for the following diagnostic result:</p> <p>Testing completed and no issues were found on this device.</p> <p>If AST 2 is not available, follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Face ID functionality.</p> <p>Did the device pass all tests?</p>	No	Go to step 10.	`\${nodeText.noSymptomCode}`	
9.	Repeat Quick Check steps to verify Face ID functionality.	Yes	Issue cannot be duplicated.	`\${nodeText.yesSymptomCode}`	
	<p>If the following issues occur, Face ID is not responding as expected:</p> <ul style="list-style-type: none"> <li>There are authentication errors or failures on the user's device when attempting to use their face to unlock the device.</li> <li>Multiple people are having problems enrolling their face.</li> <li>Registration process cannot begin because the device cannot detect any face.</li> </ul> <p>Is Face ID responding as expected?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE
10.	<p>Check diagnostic results to verify the functionality of Face ID hardware.</p> <p>Look for the following diagnostic results:</p> <p>There is an issue with the TrueDepth camera affecting Face ID.</p> <p>There may be an issue with the TrueDepth camera affecting Face ID. Restart the device and run the test again.</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE
	<p>Is the diagnostic result listed here?</p>	No	Go to step 11.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
11.	Check diagnostic results to verify the functionality of Face ID hardware.	Yes	Go to step 15.	\$(nodeText.yesSymptomCode)	
	<p>Look for the following diagnostic results:</p> <p>There is an issue with the TrueDepth camera affecting Face ID. Attempt an erase or restore of the device and run the test again.</p> <p>Is the diagnostic result listed here?</p>	No	Go to step 12.	\$(nodeText.noSymptomCode)	
12.	Check diagnostic results to verify the functionality of Face ID hardware.	Yes	Go to step 13.	\$(nodeText.yesSymptomCode)	
	<p>Look for the following diagnostic results:</p> <p>There may be an issue with the TrueDepth camera affecting Face ID. Run the test again.</p> <p>The device is not within normal operating temperature. Allow the device to return to normal operating temperature and run the test again.</p> <p>The device's battery is not sufficiently charged. Charge the battery to at least 20 % and run the test again.</p> <p>Is the diagnostic result listed here?</p>	No	<p><b>ESCALATION REQUIRED.</b></p> <p>Contact ACS for additional support or a multipart repair.</p>	\$(nodeText.noSymptomCode)	
13.	Run AST 2 Face ID suite on the user's device.	Yes	Go to step 14.	\$(nodeText.yesSymptomCode)	
	<p>Check diagnostic results to verify the functionality of Face ID hardware.</p> <p>Look for the following diagnostic result:</p> <p>Testing completed and no issues were found on this device.</p> <p>If AST 2 is not available, follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Face ID functionality.</p> <p>Did the device pass all tests?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE



	Check	Result	Action	Code	Commodity
14.	Repeat Quick Check steps to verify Face ID functionality.	Yes	Issue resolved.	\$(nodeText.yesSymptomCode)	
	<p>If the following issues occur, Face ID is not responding as expected:</p> <ul style="list-style-type: none"> <li>There are authentication errors or failures on the user's device when attempting to use their face to unlock the device.</li> <li>Multiple people are having problems enrolling their face.</li> <li>Registration process cannot begin because the device cannot detect any face.</li> </ul> <p>Is Face ID responding as expected?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE
15.	Follow the steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If restore fails, attempt recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .	Yes	Go to step 17.	\$(nodeText.yesSymptomCode)	
	<p><b>Warning:</b> Restoring the device will delete all user data. Verify user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	No	Go to step 16.	\$(nodeText.noSymptomCode)	
16.		Yes	Go to step 17.	\$(nodeText.yesSymptomCode)	
	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
17.	Run AST 2 Face ID suite on the user's device.	Yes	Go to step 18.	\$(nodeText.yesSymptomCode)	
	<p>Check diagnostic results to verify the functionality of Face ID hardware.</p> <p>Look for the following diagnostic result:</p> <p>Testing completed and no issues were found on this device.</p> <p>If AST 2 is not available, follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Face ID functionality.</p> <p>Did the device pass all tests?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE
18.	Repeat Quick Check steps to verify Face ID functionality.	Yes	Issue resolved by restoring the device.	\$(nodeText.yesSymptomCode)	
	<p>If the following issues occur, Face ID is not responding as expected:</p> <ul style="list-style-type: none"> <li>• There are authentication errors or failures on the user's device when attempting to use their face to unlock the device.</li> <li>• Multiple people are having problems enrolling their face.</li> <li>• Registration process cannot begin because the device cannot detect any face.</li> </ul> <p>Is Face ID responding as expected?</p>	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE

# Proximity Sensor Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Screen stays on during a call when iPhone is lifted to ear.</li><li>Screen immediately turns off when user is making a call.</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Clean the display with a clean microfiber cloth. Important: Do not use liquids, sprays, or abrasives to clean the device.</li><li>Rule out environmental causes by checking and removing protective films and cases.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>Quit any apps that are running in the background.</li><li>Restart the device. If the device does not restart, try to reset it.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return device to user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test proximity sensor functionality.</p> <p>Did the display respond as expected?</p>	Yes	Issue resolved. Remind user that protective films and cases can prevent proximity sensor from responding properly.	\${nodeText.yesSymptomCode}	
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	<p>Determine if the device has physical damage that makes a component repair impossible.</p> <p>Is the device eligible for a component repair?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B54	IPHONE COMP DISPLAY
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B54	IPHONE

# Side Button Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Side button not working</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Restart the device. If the device does not restart, try to reset it.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify by connecting the device to iTunes.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 2.	`\${nodeText.yesSymptomCode}`	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 3.	`\${nodeText.noSymptomCode}`	
2.	Inspect the area in and around the side button on the user's device. If you see any damage or debris, then answer "Yes" to the question below.	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p>If the button is either stuck or cannot be pressed, then check for the following:</p> <ul style="list-style-type: none"><li>Substance causing button to be stuck in one position</li><li>Debris blocking button so the button cannot be pressed or toggled</li><li>Physically broken button</li></ul> <p>Is button stuck, blocked by debris, or physically broken?</p>	No	Go to step 4.	`\${nodeText.noSymptomCode}`	
3.	Determine whether the device is eligible for out of warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
	Is the device eligible for out of warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
4.	Run the Side Button diagnostic suite in AST 2. This test verifies side button functionality.	Yes	Issue cannot be duplicated.	`\${nodeText.yesSymptomCode}`	
	Check diagnostic results to verify side button response.				
	If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test side button functionality.	No	Go to step 5.	`\${nodeText.noSymptomCode}`	
	Is the side button responding as expected?				
5.	Go to Settings > General > Reset > Erase All Content and Settings.				
	<b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify user has a backup or has given consent before proceeding.	Yes	Issue resolved by erasing all content and settings.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 6.	`\${nodeText.noSymptomCode}`	
6.	Is the side button responding as expected?				
	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
	<b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	No	Go to step 7.	`\${nodeText.noSymptomCode}`	
	Did restore complete?				
7.		Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
	Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
	Did restore complete?				
8.	Run the Side Button diagnostic suite in AST 2 to verify side button functionality.				
	Check diagnostic results to verify side button response.	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	
	If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test side button functionality.	No	Go to step 9.	`\${nodeText.noSymptomCode}`	
	Is the side button responding as expected?				
	Follow instructions in the service guide to open the device.		Reassemble and return the		

Using iPhone Torque Driver (black) 0.35 kg-fcm and JCIS Bit for cross-head screws (Torque Driver Kit, 923-0248), remove the cowling highlighted in the image below and carefully lift the button flex cable connector to disconnect it.

iPhone 7	iPhone 7 Plus
iPhone 8	iPhone 8 Plus
iPhone X	
iPhone Xs	iPhone Xs Max

Magnify the side button flex connector and inspect it for any films or foreign material that may block access to it.

iPhone 7	iPhone 7 Plus
iPhone 8	iPhone 8 Plus

Yes	device to the user. Due to unauthorized modification, the device is not eligible for service.	\${nodeText.yesSymptomCode}	
No	Go to step 10.	\${nodeText.noSymptomCode}	

	iPhone X				
	iPhone Xs	iPhone Xs Max			
	Is there a film or foreign material blocking the connector?				
10.	<p>Reconnect the side button flex cable, gently reseating the connector by lightly pressing on it with two fingers. Reattach the cowl and reassemble the device.</p> <p>Run the Side Button diagnostic suite in AST 2 to verify side button functionality.</p> <p>Check diagnostic results to verify side button response.</p> <p>If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test side button functionality.</p> <p>Is the side button responding as expected?</p>	Yes	Issue resolved by reseating side button flex cable.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B38	IPHONE



# Temperature Alert

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>User claims device or AC adapter becomes unusually warm during use</li><li>Temperature alert message appears</li><li>Battery charging is disabled</li><li>Display brightness dims</li><li>Apps close</li><li>Device turns off</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information</p> <ol style="list-style-type: none"><li>When the device is in use or charging, it is normal for it to get warm. The exterior of the device acts as a cooling surface that transfers heat from inside the device to the cooler air outside.</li><li>Refer to <a href="#">HT201678: Keeping iPhone, iPad, and iPod touch within acceptable operating temperatures</a>.</li><li>Remove any covers or cases from the device.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Allow the device to cool. The device will follow these automated steps before returning to full function.	Yes	Issue resolved.	\$(nodeText.yesSymptomCode)	
	<ul style="list-style-type: none"><li>Battery charging is disabled</li><li>Screen dims</li><li>Cellular transmission power is reduced</li><li>Apps close, phone calls end, a temperature warning screen appears</li><li>Device turns off</li></ul> <p>After the device cools, does it return to normal operation?</p>	No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 4.	\$(nodeText.yesSymptomCode)	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 3.	\$(nodeText.noSymptomCode)	
3.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 4.	\$(nodeText.yesSymptomCode)	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
4.	Run AST 2 MRI on the user's device.  Check diagnostic results to verify the presence of multiple temperature warnings.  Has the device experienced multiple temperature warnings?	Yes	Go to step 5.	\$(nodeText.yesSymptomCode)	
		No	Issue cannot be duplicated.  Refer user to <a href="#">HT201678: Keeping iPhone, iPad, and iPod touch within acceptable operating temperatures.</a>	\$(nodeText.noSymptomCode)	
5.	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .  <b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.  Did restore complete?	Yes	Go to step 7.	\$(nodeText.yesSymptomCode)	
		No	Go to step 6.	\$(nodeText.noSymptomCode)	
6.	Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	Yes	Go to step 7.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
7.	Advise user to set up the device as a new device by following the steps in <a href="#">HT202033: Set up your iPhone, iPad, or iPod touch</a> .  Attempt to reproduce the temperature warning screen by launching and using a high-bandwidth or graphics-intensive app.  Can you reproduce the temperature warning screen?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0M	IPHONE
		No	Issue resolved by restoring the device to the latest version of iOS.	\$(nodeText.noSymptomCode)	

# Volume and Ringer Button Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Ring/Silent switch not working</li><li>Volume buttons not working</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <p><b>Note:</b> This procedure is for volume buttons and Ring/Silent switch issues only. If device issue is related to the Taptic Engine (vibe motor), return to the list of symptoms and select “No Vibrate” from the troubleshooting section.</p> <ol style="list-style-type: none"><li>Restart the device. If the device does not restart, try to reset it.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 2.	`\${nodeText.yesSymptomCode}`	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 3.	`\${nodeText.noSymptomCode}`	
2.	Inspect the area in and around the volume buttons and Ring/Silent switch on the user's device. If you see any damage or debris, then answer “Yes” to the question below.	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p>If the button or switch is either stuck or can not be pressed or toggled, then check for the following:</p> <ul style="list-style-type: none"><li>Substance causing button or switch to be stuck in one position</li><li>Debris blocking button or switch so you cannot press or toggle button or switch</li><li>Physically broken button or switch</li></ul> <p>Is button or switch stuck, blocked by debris, or physically broken?</p>	No	Go to step 4.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
3.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
		No	Return device to user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	
4.	<p>Run the Ring/Silent Switch diagnostic suite in AST 2 to verify Ring/Silent switch functionality.</p> <p>Check diagnostic results to verify Ring/Silent switch response.</p> <p>If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Ring/Silent switch functionality.</p> <p>Is Ring/Silent switch responding as expected?</p>	Yes	Go to step 5.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 6.	`\${nodeText.noSymptomCode}`	
5.	<p>Run the Volume Button diagnostic suite in AST 2 to verify the functionality of the volume buttons.</p> <p>Check diagnostic results to verify volume buttons response.</p> <p>If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test volume button functionality.</p> <p>Are volume buttons responding as expected?</p>	Yes	Issue cannot be duplicated.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 7.	`\${nodeText.noSymptomCode}`	
6.	<p>Run the Volume Button diagnostic suite in AST 2 to verify the functionality of the volume up and volume down buttons.</p> <p>Check diagnostic results to verify volume button response.</p> <p>If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test volume button functionality.</p> <p>Are volume buttons responding as expected?</p>	Yes	Go to step 7.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 12.	`\${nodeText.noSymptomCode}`	
7.	<p>Go to Settings &gt; General &gt; Reset &gt; Erase All Content and Settings.</p> <p><b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.</p> <p>Is the button issue resolved?</p>	Yes	Issue resolved by erasing all content and settings.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 8.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
8.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 10.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 9.	`\${nodeText.noSymptomCode}`	
9.	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 10.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
10.	<p>Run the Ring/Silent Switch diagnostic suite in AST 2 to verify Ring/Silent switch functionality.</p> <p>Check diagnostic results to verify Ring/Silent switch response.</p> <p>If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Ring/Silent switch functionality.</p> <p>Is Ring/Silent switch responding as expected?</p>	Yes	Go to step 11.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 12.	`\${nodeText.noSymptomCode}`	
11.	<p>Run the Volume Button diagnostic suite in AST 2 to verify the functionality of the volume buttons.</p> <p>Check diagnostic results to verify volume button response.</p> <p>If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test volume button functionality.</p> <p>Are volume buttons responding as expected?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 12.	`\${nodeText.noSymptomCode}`	
	<p>Follow instructions in the service guide to open the device.</p> <p>Use iPhone Torque Driver (black) 0.35 kg-fcm and JCIS Bit for cross-head screws (Torque Driver Kit, 923-0248) to remove the cowling highlighted in the image below and carefully lift the button flex cable connector to disconnect it.</p>	Yes	Reassemble and return the device to the user. Due to unauthorized modification, the device is not eligible for service.	`\${nodeText.yesSymptomCode}`	

iPhone 7	iPhone 7 Plus
iPhone 8	iPhone 8 Plus
iPhone X	
iPhone Xs	iPhone Xs Max

12.

Magnify the volume up/down flex connector and inspect it for any films or foreign material that may block access to it.

iPhone 7	iPhone 7 Plus
iPhone 8	iPhone 8 Plus
iPhone X	

No

Go to step 13.

\${nodeText.noSymptomCode}

	<table><tr><td>iPhone Xs</td><td>iPhone Xs Max</td></tr><tr><td></td><td></td></tr></table>	iPhone Xs	iPhone Xs Max						
iPhone Xs	iPhone Xs Max								
Is there a film or foreign material blocking the connection?									
13.	<p>Reconnect the button flex cable, gently reseating the connector by lightly pressing on it with two fingers. Reassemble the device.</p> <p>Run the Ring/Silent Switch diagnostic suite in AST 2 to verify Ring/Silent switch functionality.</p> <p>Check diagnostic results to verify Ring/Silent switch response.</p> <p>If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test Ring/Silent switch functionality.</p> <p>Is Ring/Silent switch responding as expected?</p>	Yes	Go to step 14.	`\${nodeText.yesSymptomCode}`					
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B37	IPHONE				
14.	<p>Run the Volume Button diagnostic suite in AST 2 to verify the functionality of the volume buttons.</p> <p>Check diagnostic results to verify volume button response.</p> <p>If AST 2 is unavailable, then follow steps in <a href="#">TP1045: iPhone Functional Test</a> to test volume button functionality.</p> <p>Are volume up/down buttons responding as expected?</p>	Yes	Issue resolved by reseating volume up/down button flex cable.	`\${nodeText.yesSymptomCode}`					
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B39	IPHONE				

# Alert Messages on Device Screen or in iTunes

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>• “Use iTunes to Recover” window</li><li>• Alert or error messages on the device</li><li>• Alert or error message in iTunes</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. <a href="#">Refer to HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>1. Read alert to determine the issue. Many alerts provide additional information or links to resolve the issue. Refer to <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT202778: About the 'Trust This Computer' alert on your iPhone, iPad, or iPod touch</a>.</li><li>2. Restart device. If the device does not restart, try to reset it.</li><li>3. On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>4. Try the Lightning connector in both orientations.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	



	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod, and AirPods: Cleaning Procedures</a> to clean the Lightning connector.</p> <p>Are you able to clean the connector?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Disconnect and reconnect the Lightning to USB Cable to ensure a good connection to the user's device.</p> <p>Disconnect and reconnect the Lightning connector in both orientations.</p> <p>Retest to determine if alert message issue is resolved.</p> <p>Is the issue resolved?</p>	Yes	Issue resolved by cleaning.	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	<p>Go to Settings &gt; General &gt; Reset &gt; Erase All Content and Settings.</p> <p><b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did erasing all content and settings resolve the issue?</p>	Yes	Issue resolved by erasing all content and settings.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	
6.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Go to step 7.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
7.	Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
8.	Retest to determine if alert message issue is resolved.  Is the issue resolved?	Yes	Issue resolved by restoring the device to the latest version of iOS.	\${nodeText.yesSymptomCode}	
		No	<b>ESCALATION REQUIRED.</b>  Contact ACS for additional support.	B0J	

# App Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>App not functioning correctly</li><li>App unexpectedly quits (returns to Home screen)</li><li>App screen unexpectedly freezes (stops responding)</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> For more information.</p> <ol style="list-style-type: none"><li>Restart the device. If the device does not restart, try to reset it.</li><li>Verify that the app is compatible with the device.</li><li>Follow steps in <a href="#">HT201398: If an app unexpectedly quits, stops responding, or won't open</a> to attempt to resolve the issue.</li><li>Open the App Store on the user's device and tap Updates in the bottom right corner. If any updates are available, then tap Update All in the upper right corner.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>Remove and reinstall affected app.</li></ol> <p><b>Note:</b> If multiple apps are having similar issues, go to Deep Dive.</p>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	`\${nodeText.noSymptomCode}`	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
3.	<p>Run AST 2 MRI diagnostic suite to identify any crashing apps that may unexpectedly stop responding or quit to the Home screen.</p> <p><b>Note:</b> It is generally not necessary to force an app to close unless the app is unresponsive. Refer to <a href="#">HT202070: Switch apps on your iPhone, iPad, or iPod touch</a> for instructions to view recently used apps. These apps are not open; they are in a suspended state.</p> <p>Are there any crashing apps listed in diagnostic results?</p>	Yes	Go to step 5.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 4.	`\${nodeText.noSymptomCode}`	
4.	<p>Go to Settings &gt; General &gt; Reset &gt; Erase All Content and Settings.</p> <p><b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.</p> <p>Is the app issue resolved?</p>	Yes	<p>Issue resolved by erasing all content and settings.</p> <p>Instruct user how to quit background processes on the device that are not performing as expected.</p> <p>Also advise the user to follow steps in <a href="#">HT202070: Switch apps on your iPhone, iPad, or iPod touch</a>.</p>	`\${nodeText.yesSymptomCode}`	
		No	Go to step 5.	`\${nodeText.noSymptomCode}`	
5.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 7.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 6.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
6.	<p>Follow the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	IPHONE
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	
7.	<p>Advise user to follow instructions in <a href="#">HT202033: Set up your iPhone, iPad, or iPod touch</a> to set up the device as a new device.</p> <p>Retest to determine if the user's device continues to exhibit app issues.</p> <p>Is the app issue resolved?</p>	Yes	<p>Issue resolved.</p> <p>If errors were found and fixed or if this was the first successful restore on the device, advise the user to see if the symptoms persist.</p>	\${nodeText.yesSymptomCode}	
		No	Go to step 8.	\${nodeText.noSymptomCode}	
8.	<p>Determine if the app is an iOS app or a third-party app.</p> <p>Is the app an iOS app or third-party app?</p>	iOS	<p><b>ESCALATION REQUIRED.</b></p> <p>Contact ACS for additional support.</p>	\${nodeText.yesSymptomCode}	
		Third Party	Reinstall the affected third-party app and refer user to third-party app developer for support.	\${nodeText.noSymptomCode}	

# Unexpected Freeze/Restart/Power Off, “Connect to iTunes”

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>• Device unexpectedly displays Apple logo, then returns to Home screen and operates normally.</li><li>• Device unexpectedly displays Apple logo, then restarts to Lock screen, requiring Touch ID or passcode to return to Home screen.</li><li>• Device restarts, displays Apple logo, then stops responding.</li><li>• Device screen freezes, but does not restart or turn off.</li><li>• Device stops responding and unexpectedly displays “Connect to iTunes” screen.</li><li>• Device unexpectedly turns off and requires pressing the Sleep/Wake button to turn device back on.</li></ul> <p><b>Note:</b> While exhibiting any of the above symptoms, the device may also unexpectedly flash a red, blue, or other color screen.</p>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <p>If the device restarts, displays the Apple logo, or turns off while in use, follow steps in <a href="#">HT203899: If your iOS device restarts or displays the Apple logo or a spinning gear unexpectedly</a> before performing any further troubleshooting.</p> <ol style="list-style-type: none"><li>1. Restart the device. If the device does not restart, try to reset it.</li><li>2. On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software.</li><li>3. For unresponsive devices, determine whether the issue is related to Multi-Touch. View the clock on the Home screen or on the Clock app icon to see if it's keeping time. The second hand on the Clock app icon should move smoothly clockwise around the clock dial. If the clock is not keeping time, return to the list of symptoms and select “Multi-Touch or 3D Touch Issues” from the troubleshooting menu.</li><li>4. If the device does not respond or turn on, follow steps in <a href="#">HT201412: If your iPhone, iPad, or iPod touch won't turn on or is frozen</a>. Check symptoms in multiple preinstalled Apple apps to verify that this is happening in all apps before servicing the device. If symptoms do not occur with all apps, return to the service guide table of contents and select “App Issues” from the troubleshooting section.</li><li>5. If the device has unexpectedly turned off and will not turn on, return to the service guide table of contents and select “No Power” from the troubleshooting section.</li><li>6. If the user's device is running iOS 11.3 or later, follow steps in <a href="#">HT208387: iPhone Battery and Performance</a>. Go to Settings &gt; Battery &gt; Battery Health (Beta) to view Peak Performance Capability. Performance management features may have been applied to help prevent unexpected shutdowns. In iOS 11.3 and later this feature can be disabled. If the user's device is experiencing unexpected shutdowns because the battery was unable to deliver the necessary peak power, performance management may need to remain enabled. If you suspect that the battery may need service, return to the service guide table of contents and select “Battery Life Too Short” from the troubleshooting section.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 2.	`\${nodeText.noSymptomCode}`	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	
3.	<p>If the device restarts, displays the Apple logo, or turns off while in use, follow steps in <a href="#">HT203899: If your iOS device restarts or displays the Apple logo or a spinning gear unexpectedly</a> before performing any further troubleshooting.</p> <p>Does the device contain more than two recent logs with the word “panic” in the file name?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B81	IPHONE
		No	Go to step 4.	`\${nodeText.noSymptomCode}`	
4.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 6.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 5.	`\${nodeText.noSymptomCode}`	
5.	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 6.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 7.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
6.	Retest to determine if the user's device continues to have this issue.  Is the issue resolved?	Yes	Issue resolved.  If errors were found and corrected or if this was the first successful restore on the device, advise the customer to see if the symptoms persist.	\${nodeText.yesSymptomCode}	
		No	Go to step 7.	\${nodeText.noSymptomCode}	
7.	Determine if the issue is caused by the device unexpectedly displaying "Connect to iTunes" screen.  Does the device exhibit this symptom?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
		No	Go to step 8.	\${nodeText.noSymptomCode}	
8.	Determine if the issue is caused by the device exhibiting any of the following symptoms: <ul style="list-style-type: none"> <li>• Device unexpectedly displays the Apple logo</li> <li>• Device unexpectedly restarts to the Lock screen</li> <li>• Device unexpectedly turns off and can be turned on again manually</li> </ul> Does the device exhibit any of these symptoms?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B81	IPHONE
		No	Go to step 9.	\${nodeText.noSymptomCode}	
9.	Determine if the issue is caused by the device exhibiting any of the following symptoms: <ul style="list-style-type: none"> <li>• Device becomes unresponsive (display appears frozen)</li> <li>• Device restarts and only displays the Apple logo</li> </ul> Does the device exhibit any of these symptoms?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B85	IPHONE
		No	<b>ESCALATION REQUIRED.</b>  Contact ACS for additional support or a multipart repair.	B81	





# Headphone Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>No sound in EarPods with Lightning Connector</li><li>Sound from only one EarPod</li><li>Distorted sound in EarPods with Lightning Connector</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>Refer to <a href="#">HT201869: Use Apple headphones with your iPhone, iPad, and iPod</a> to verify that the user's headphones are compatible with the user's device.</li><li>Follow the steps in <a href="#">HT203026: If your headphones don't work with your iPhone, iPad, or iPod touch</a>.</li><li>Verify that the user's EarPods with Lightning Connector are fully inserted into the Lightning connector. Make sure a case or protective film is not interfering.</li><li>Try the Lightning connector in both orientations.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>Press volume buttons to check volume level.</li><li>Verify that the audio is not paused.</li><li>Check Settings &gt; Music &gt; Volume Limit.</li><li>Go to Settings &gt; General &gt; Accessibility and verify that Mono Audio is turned off. <b>Note:</b> If the user has intentionally turned on Mono Audio, do not turn it off.</li><li>Restart the device. If the device does not restart, try to reset it.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod, and AirPods: Cleaning Procedures</a> to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Connect the user's EarPods with Lightning Connector to the user's device.</p> <p>Play known-good media and listen to the audio using the user's headphones.</p> <p>Did the device play audio as expected?</p>	Yes	Issue resolved by cleaning device.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 5.	`\${nodeText.noSymptomCode}`	
5.	<p>Substitute known-good EarPods with Lightning Connector.</p> <p>Play known-good media and listen to the audio using the known-good EarPods.</p> <p>Did the device play audio as expected?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.  If user has third-party headphones, refer to manufacturer for support.	B09	IPHONE ACCESSORY
		No	Go to step 6.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
6.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 7.	`\${nodeText.noSymptomCode}`	
7.	<p>Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
8.	<p>Continue to use known-good EarPods with Lightning Connector with the user's device.</p> <p>Play known-good media and listen to the audio using the user's headphones.</p> <p>Did the device play audio as expected?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B68	IPHONE

# Headphone Microphone Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>No audio from mic on EarPods with Lightning Connector</li><li>Distorted sound from mic on EarPods with Lightning Connector</li><li>Buttons on EarPods with Lightning Connector do not function</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>This procedure is intended for headphone microphone issues only. If the issue is with the device microphone, return to the list of symptoms and select "Microphone Issues" from the iOS Sound section of the troubleshooting menu</li><li>Refer to <a href="#">HT201869: Use Apple headphones with your iPhone, iPad, and iPod</a> to verify that the user's headphones are compatible with the user's device.</li><li>Follow the steps in <a href="#">HT203026: If your headphones don't work with your iPhone, iPad, or iPod touch</a>.</li><li>Verify that the user's EarPods with Lightning Connector are fully inserted into the Lightning connector. Make sure a case or protective film is not interfering with the connection.</li><li>Try the Lightning connector in both orientations.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify by connecting the device to iTunes.</li><li>Restart the device. If the device does not restart, try to reset it.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod, and AirPods: Cleaning Procedures</a> to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Connect the user's EarPods with Lightning Connector to the user's device.</p> <p>Open the Voice Memos app.</p> <p>Use the user's EarPods with Lightning Connector microphone to create and play a recording.</p> <p>Did the device record audio as expected?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	
5.	<p>Connect the user's EarPods with Lightning Connector to the user's device.</p> <p>Navigate to the Home screen on the user's device to perform button tests on the user's EarPods with Lightning Connector.</p> <p>Press the volume up button followed by the volume down button. The volume should appear on the device's screen along with the word "Headphones". The volume setting should increase and decrease as these buttons are pressed.</p> <p>Press and hold the center button to activate Siri (or Voice Control if Siri has been disabled). Observe the device's display to confirm whether Siri or Voice Control appears when the center button is pressed and held down.</p> <p>If any of the above button tests do not perform as expected, then select the "No" answer.</p> <p>Do all button tests perform as expected?</p>	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
		No	Go to step 7.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Connect known-good EarPods with Lightning Connector to user's device.	Yes	Go to step 7.	\$(nodeText.yesSymptomCode)	
	Open the Voice Memos app.				
6.	Using EarPods with Lightning Connector, create a recording and play it back.	No	Go to step 8.	\$(nodeText.noSymptomCode)	
	Did the device record audio as expected?				
7.	Connect known-good EarPods with Lightning Connector to the user's device.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
	Navigate to the Home screen on user's device to perform button tests on the EarPods with Lightning Connector.				
	Press the volume up button followed by the volume down button. The volume should appear on the device's screen along with the word "Headphones". The volume setting should increase and decrease as these buttons are pressed.				
	Press and hold the center button to activate Siri (or Voice Control if Siri has been disabled). Observe the device's display to confirm whether Siri or Voice Control appears when the center button is pressed and held down.				
7.	If any of the above button tests do not perform as expected, then select the "No" answer.	No	Go to step 8.	\$(nodeText.noSymptomCode)	
	Do all button tests perform as expected?				
8.	Go to Settings > General > Reset > Erase All Content and Settings.	Yes	Go to step 12.	\$(nodeText.yesSymptomCode)	
	<b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify user has a backup or has given consent before proceeding.				
	Open Voice Memos app.	No	Go to step 9.	\$(nodeText.noSymptomCode)	
	Use the known-good EarPods with Lightning Connector to create and play a recording.				
8.	Did the device record audio as expected?				

	Check	Result	Action	Code	Commodity
9.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 11.	\$(nodeText.yesSymptomCode)	
		No	Go to step 10.	\$(nodeText.noSymptomCode)	
10.	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 11.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
11.	<p>Open the Voice Memos app.</p> <p>Use the known-good EarPods with Lightning Connector to create and play a recording.</p> <p>Did the device record audio as expected?</p>	Yes	Go to step 12.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B68	IPHONE



	Check	Result	Action	Code	Commodity
12.	Connect known-good EarPods with Lightning Connector to the user's device.	Yes	Issue resolved.	\${nodeText.yesSymptomCode}	
	<p>Navigate to the Home screen on user's device to perform button tests on the EarPods with Lightning Connector.</p> <p>Press the volume up button followed by the volume down button. The volume should appear on the device's screen along with the word "Headphones". The volume setting should increase and decrease as these buttons are pressed.</p> <p>Press and hold the center button. This should activate Siri (or Voice Control if Siri has been disabled). Observe the device's display to confirm whether Siri or Voice Control appears when the center button is pressed and held down.</p> <p>If any of the above button tests do not perform as expected, then select the "No" answer.</p> <p>Do all button tests perform as expected?</p>	No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B68	IPHONE

# Microphone Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Microphone not functioning</li><li>Distorted sound from microphone</li><li>User cannot be heard during telephone call</li><li>Poor, low, or distorted sound during telephone call</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>If the issue is with the microphone built in to the Apple headphones, return to the service guide table of contents and select “Headphone Microphone Issues” from the troubleshooting section.</li><li>Make sure a case or protective film is not obstructing the microphone.</li><li>Follow steps in <a href="#">HT203792: Get help with the microphones on your iPhone, iPad, and iPod touch</a> and <a href="#">HT203800: If you can't hear a person on a call or voicemail or if the sound isn't clear on your iPhone</a>.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.  <b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.  Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
		No	Go to step 2.	\$(nodeText.noSymptomCode)	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).  Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\$(nodeText.yesSymptomCode)	
		No	Return the device to the user. Due to damage, device is no longer eligible for support.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
3.	<p>Check the following microphone locations for debris obstruction:</p> <ul style="list-style-type: none"> <li>• Bottom of device</li> <li>• Receiver mesh</li> <li>• Back of device near rear camera</li> </ul> <p>Follow steps in <a href="#">TP320: iPhone, iPad, iPod: Cleaning Procedures</a> to clean the device.</p> <p>Are you able to clean the device?</p>	Yes	Go to step 4.	\$(nodeText.yesSymptomCode)	IPHONE
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	
4.	<p>Run the Audio diagnostic in AST 2 to verify that all microphones function properly on the user's device.</p> <p>If the device fails the speaker or receiver test, then return to the service guide table of contents and select "Speaker/Receiver Issues" from the troubleshooting section.</p> <p>If AST 2 is not available, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to verify that all microphones function properly on the user's device.</p> <p>Does the user's device pass all audio tests?</p>	Yes	Go to step 5.	\$(nodeText.yesSymptomCode)	
		No	Go to step 6.	\$(nodeText.noSymptomCode)	
5.	<p>If the symptom is that the user cannot be heard during a telephone call, then use a known-good phone to call the user's device.</p> <p><b>Note:</b> The phone does not need to be an iPhone.</p> <p>Have a short phone conversation. Speak in a normal voice and listen to verify if audio is present in both directions, and that audio quality is as expected.</p> <p>Was audio quality as expected?</p>	Yes	Issue resolved by cleaning the device.	\$(nodeText.yesSymptomCode)	
		No	Go to step 6.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
6.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	\$(nodeText.yesSymptomCode)	
		No	Go to step 7.	\$(nodeText.noSymptomCode)	
7.	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
8.	<p>Run the Audio diagnostic in AST 2 to verify that all microphones function properly on the user's device.</p> <p>If AST 2 is not available, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test microphone sound quality.</p> <p>Does the user's device pass all audio tests?</p>	Yes	Go to step 9.	\$(nodeText.yesSymptomCode)	
		No	Go to step 10.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
9.	<p>If the symptom is that the user cannot be heard during a telephone call, then use a known-good phone to call the user's device.</p> <p><b>Note:</b> The phone does not need to be an iPhone.</p> <p>Have a short phone conversation. Speak in a normal voice and listen to verify if audio is present in both directions, and that audio quality is as expected.</p> <p>Was audio quality as expected?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7B	IPHONE
10.	<p>Determine which component failed the diagnostic test: rear microphone, bottom microphone, or receiver/front microphone.</p> <p>If the speaker or receiver tests failed, then return to the service guide table of contents and select "Speaker/Receiver Issues" from the troubleshooting section.</p> <p>Which microphone failed the audio test?</p>	Bottom or Rear/Back	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B64	IPHONE
		Top/Front	Go to step 11.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
11.	Determine if the device has any physical damage that makes this component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B64	IPHONE COMP DISPLAY
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B64	IPHONE

# No Ringer Sound

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>No or low ringer sound</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>If issue is with headphone audio, then return to the service guide table of contents and select "Headphone Issues" from the troubleshooting section.</li><li>Follow steps in <a href="#">HT203800: If you can't hear a person on a call or voicemail or if the sound isn't clear on your iPhone</a>.</li><li>Check that the Ring/Silent switch is set for ring and not vibrate.</li><li>Press volume buttons to check volume level.</li><li>Check ringer volume in Settings &gt; Sounds &amp; Haptics.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>iPhone is capable of using the receiver as a second speaker. Ask the user questions to determine if the issue involves this capability. If the issues involves this capability, then first ensure that the following settings are configured as listed:  <b>Note:</b> Different settings could cause audio output to be low in volume or only emitted from one of the two speakers, which could be mistaken for a service issue.<ol style="list-style-type: none"><li>On the device, go to Settings &gt; General &gt; Accessibility.</li><li>Scroll down to the HEARING section.</li><li>Verify that all hearing devices and Mono Audio are turned off.</li><li>Adjust the audio volume balance to the center of the range.</li></ol></li><li>Make sure a case or protective film is not obstructing the speaker or receiver.</li><li>Restart the device. If the device does not restart, try to reset it.</li></ol> <p><b>Note:</b> There is only one speaker at the bottom of the device. The other opening is a microphone.</p> <p>The receiver is covered with mesh and located on the front of the device, toward the top of the display, next to the front-facing camera.</p>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Check the speaker and receiver for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod: Cleaning Procedures</a> to clean the speaker and receiver.</p> <p>Are you able to clean the speaker and receiver?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Run the Audio diagnostic in AST 2 to verify that the speaker and receiver function properly on the user's device.</p> <p>If the device fails the microphone tests, then return to the service guide table of contents and select the "Microphone Issues" from the troubleshooting section.</p> <p>If AST 2 is not available, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to verify that the speaker and receiver function properly on the user's device.</p> <p>Do all audio tests pass on user's device?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	



	Check	Result	Action	Code	Commodity
5.	Go to Settings > Sounds & Haptics > Ringtone and select a ringtone.	Yes	Issue resolved by cleaning the device.	\$(nodeText.yesSymptomCode)	
	Does the device ring?	No	Go to step 6.	\$(nodeText.noSymptomCode)	
6.	Go to Settings > General > Reset > Erase All Content and Settings.  <b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.	Yes	Issue resolved by erasing all content and settings.	\$(nodeText.yesSymptomCode)	
	Go to Settings > Sounds & Haptics > Ringtone and select a ringtone.  Does the device ring?	No	Go to step 7.	\$(nodeText.noSymptomCode)	
7.	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .	Yes	Go to step 9.	\$(nodeText.yesSymptomCode)	
	<b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.  Did restore complete?	No	Go to step 8.	\$(nodeText.noSymptomCode)	
8.		Yes	Go to step 9.	\$(nodeText.yesSymptomCode)	
	Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	BOJ	IPHONE
9.	Run the Audio diagnostic in AST 2 to verify that the speaker and receiver function properly on the user's device.	Yes	Go to step 10.	\$(nodeText.yesSymptomCode)	
	If AST 2 is not available, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test speaker and receiver sound quality.  Does the user's device pass all audio tests?	No	Go to step 11.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
10.	Go to Settings > Sounds & Haptics > Ringtone and select a ringtone.	Yes	Issue resolved by restoring the device to the latest version of iOS.	`\${nodeText.yesSymptomCode}`	
	Does the device ring?	No	Go to step 11.	`\${nodeText.noSymptomCode}`	
11.	Determine which component failed the diagnostic test: speaker or receiver.	Speaker	Go to step 12.	`\${nodeText.yesSymptomCode}`	
	<p>If the device failed the Receiver (Stereo Speaker) test, select 'Receiver'.</p> <p>If the device failed one or more microphone tests, then return to the service guide table of contents and select "Microphone Issues" from the troubleshooting section.</p> <p>Which component failed the diagnostic test?</p>	Receiver	Go to step 13.	`\${nodeText.noSymptomCode}`	
12.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B63	IPHONE COMP SPEAKER
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B63	IPHONE

	Check	Result	Action	Code	Commodity
13.	<p>Determine which receiver diagnostic test the device failed:</p> <p>A. Receiver B. Receiver (Stereo Speaker)</p> <p>If the device failed both tests, select B.</p> <p>Which receiver diagnostic test did the device fail?</p>	A	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A	IPHONE
		B	Go to step 14.	`\${nodeText.noSymptomCode}`	
14.	<p>Determine if the device has any physical damage that makes a component repair impossible.</p> <p>Is the device eligible for a component repair?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A	IPHONE COMP DISPLAY
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A	IPHONE

# No Vibrate

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Device does not vibrate when expected</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <p><b>Note:</b> This procedure is for vibration issues only. If the issue is related to the Ring/Silent switch, return to the service guide table of contents and select “Volume and Ringer Button Issues” from the troubleshooting section.</p> <ol style="list-style-type: none"><li>Turn the Ring/Silent switch on and off.</li><li>Check Vibrate settings for both Silent and Ring in Settings &gt; Sounds &amp; Haptics.</li><li>Restart the device. If the device does not restart, try to reset it.</li><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	<p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	<p>Is the device eligible for out-of-warranty service?</p>	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	On the device, go to Settings > Sounds & Haptics and turn the Vibrate on Ring setting from off to on.  Turning on the Vibrate on Ring setting will momentarily activate the vibration motor.  Does the device vibrate?	Yes	Go to step 8.	\$_{nodeText.yesSymptomCode}	
		No	Go to step 4.	\$_{nodeText.noSymptomCode}	
4.	Go to Settings > General > Reset > Erase All Content and Settings.  <b>Warning:</b> Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.  On the device, go to Settings > Sounds & Haptics and turn the Vibrate on Ring setting from off to on.  Turning on the Vibrate on Ring setting will momentarily activate the vibration motor.  Does the device vibrate?	Yes	Go to step 8.	\$_{nodeText.yesSymptomCode}	
		No	Go to step 5.	\$_{nodeText.noSymptomCode}	
5.	Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .  <b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.  Did restore complete?	Yes	Go to step 7.	\$_{nodeText.yesSymptomCode}	
		No	Go to step 6.	\$_{nodeText.noSymptomCode}	
6.	Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did restore complete?	Yes	Go to step 7.	\$_{nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
7.	On the device, go to Settings > Sounds & Haptics and turn the Vibrate on Ring setting from off to on.  Turning on the Vibrate on Ring setting will momentarily activate the vibration motor.  Does the device vibrate?	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Go to step 9.	\${nodeText.noSymptomCode}	
8.	Turn the Ring/Silent switch off and on to momentarily activate the vibration motor.  Does the device vibrate?	Yes	Issue resolved or cannot be duplicated.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B37	IPHONE
9.	Determine if the device has any physical damage that makes a component repair impossible.  Is the device eligible for a component repair?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B32	IPHONE COMPONENT
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B32	IPHONE

# Speaker/Receiver Issues

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>• No sound from speaker at the base of the device</li><li>• No sound from receiver</li><li>• Distorted sound from speaker or receiver</li><li>• User cannot be heard during telephone call</li><li>• Poor, low, or distorted sound during telephone call</li><li>• Low or no sound out of the bottom speaker or the receiver when playing stereo audio</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>1. If issue is with headphone audio, then return to the service guide table of contents and select "Headphone Issues" from the troubleshooting section.</li><li>2. Follow steps in <a href="#">HT203800: If you can't hear a person on a call or voicemail or if the sound isn't clear on your iPhone</a>.</li><li>3. On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>4. Press volume buttons to check volume level.</li><li>5. Verify music or audio is not paused.</li><li>6. Check Settings &gt; Music &gt; Volume Limit.</li><li>7. This device is capable of using the receiver as a second speaker. Ask the user questions to determine if the issue involves this capability. If the issues involves this capability, then first ensure that the following settings are configured as listed:  <b>Note:</b> Different settings could cause audio output to be low in volume or only emitted from one of the two speakers, which could be mistaken for a service issue.<ol style="list-style-type: none"><li>a. On the device, go to Settings &gt; General &gt; Accessibility.</li><li>b. Scroll down to the HEARING section.</li><li>c. Verify that all hearing devices and Mono Audio are turned off.</li><li>d. Adjust the audio volume balance to the center of the range.</li></ol></li><li>8. Make sure a case or protective film is not obstructing the speaker or receiver.</li></ol> <p><b>Note:</b> There is only one speaker at the bottom of the device. The other opening is a microphone.</p> <p>The receiver is covered with mesh and located on the front of the device, toward the top of the display, next to the front-facing camera.</p>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 2.	`\${nodeText.noSymptomCode}`	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	`\${nodeText.yesSymptomCode}`	
		No	Return the device to the user. Due to damage, device is no longer eligible for support.	`\${nodeText.noSymptomCode}`	
3.	<p>Check the speaker and receiver mesh openings for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod: Cleaning Procedures</a> to clean the device.</p> <p>Are you able to clean the speaker and receiver?</p>	Yes	Go to step 4.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Run the Audio diagnostic in AST 2 to verify that the speaker and receiver function properly on the user's device.</p> <p>If the device fails the microphone tests, then return to the service guide table of contents and select "Microphone Issues" from the troubleshooting section.</p> <p>If AST 2 is not available, or if the user's issue involves low or no sound when playing stereo audio through the bottom speaker and the receiver, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to verify that the speaker and receiver function properly on the user's device.</p> <p>Does the user's device pass all audio tests?</p>	Yes	Go to step 5.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 6.	`\${nodeText.noSymptomCode}`	



	Check	Result	Action	Code	Commodity
5.	<p>If the symptom is that the user cannot be heard during a telephone call, then use a known-good phone to call the user's device.</p> <p><b>Note:</b> The phone does not need to be an iPhone.</p> <p>Have a short phone conversation. Speak in a normal voice and listen to verify if audio is present in both directions, and that audio quality is as expected.</p> <p>Was audio quality as expected?</p>	Yes	Issue resolved by cleaning the device.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 6.	`\${nodeText.noSymptomCode}`	
6.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 7.	`\${nodeText.noSymptomCode}`	
7.	<p>Perform the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	BOJ	IPHONE
8.	<p>Run the Audio diagnostic in AST 2 to verify that the speaker and receiver function properly on the user's device.</p> <p>If AST 2 is not available, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test speaker and receiver sound quality.</p> <p>Does the user's device pass all audio tests?</p>	Yes	Go to step 9.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 10.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
9.	<p>If the symptom is that the user cannot be heard during a telephone call, then use a known-good phone to call to the user's device.</p> <p><b>Note:</b> The phone does not need to be an iPhone.</p> <p>Have a short phone conversation. Speak in a normal voice and listen to verify if audio is present in both directions, and that audio quality is as expected.</p> <p>Was audio quality as expected?</p>	Yes	Issue resolved by restoring the device to the latest version of iOS.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7B	IPHONE
10.	<p>Determine which component failed the diagnostic test: speaker or receiver.</p> <p>If the device failed the Receiver (Stereo Speaker) test, select 'Receiver'.</p> <p>If the device failed one or more of the microphone tests, then return to the service guide table of contents and select "Microphone Issues" from the troubleshooting section.</p> <p>Which component failed the diagnostic test?</p>	Speaker	Go to step 11.	\${nodeText.yesSymptomCode}	
		Receiver	Go to step 12.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
11.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B63	IPHONE COMP SPEAKER
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B63	IPHONE
12.	<p>Determine which receiver diagnostic test the device failed:</p> <p>A. Receiver B. Receiver (Stereo Speaker)</p> <p>If the device failed both tests, select B.</p> <p>Which receiver diagnostic test did the device fail?</p>	A	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A	IPHONE
		B	Go to step 13.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
13.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A	IPHONE COMP DISPLAY
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A	IPHONE

# Battery Life Too Short

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Battery runs out of power very quickly</li><li>Battery does not hold a charge</li><li>Short play time</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <ol style="list-style-type: none"><li>On the device, go to Settings &gt; General &gt; Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to iTunes.</li><li>On the device, go to Settings &gt; Battery to check power consumption by app. If the user's device is running iOS 11.3 or later, refer to <a href="#">HT208387: iPhone Battery and Performance</a> to view battery health in Settings &gt; Battery &gt; Battery Health (Beta).</li><li>Refer the user to <a href="http://www.apple.com/batteries">www.apple.com/batteries</a> to learn about optimizing battery settings.</li><li>Check the status bar battery level icon. It reflects the remaining battery life, including battery percentage. Turn on the battery percentage indicator using Settings &gt; Battery.</li><li>Check that the correct USB Power Adapter is being used to charge the device. Other power adapters may not provide enough power to charge the device.</li><li>Connect to a power outlet and charge the device with a known-good 10W or 12W Apple USB Power Adapter for 10 minutes. Refer to <a href="#">TP325: Charge Battery</a> for more information.</li><li>For iPhone models that support wireless charging, follow the steps in <a href="#">HT208078: How to wirelessly charge your iPhone X, iPhone 8, or iPhone 8 Plus</a>.</li><li>Try the Lightning connector in both orientations.</li><li>Restart the device. If the device does not restart, try to reset it.</li><li>Refer to <a href="#">HT201954: Unauthorized modification of iOS can cause security vulnerabilities, instability, shortened battery life, and other issues</a>.</li></ol> <p><b>Note:</b> If any of the above checks indicate that the device has no power and does not turn on, then return to the service guide table of contents and select "No Power" from the troubleshooting section.</p> <p><b>Important:</b> Battery and charge indicators can fluctuate briefly when connecting the device to power or waking it from sleep. If this occurs, wait a few seconds, then check again. Battery percentage can remain at 99 percent with a full charge. This is expected behavior and does not indicate a battery or hardware issue.</p>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Run AST 2 MRI diagnostic suite to verify battery condition.</p> <p>Check diagnostic results for a result of "Passed" or "Normal."</p> <p>Do not restore the user's device before running AST 2.</p> <p>Is the battery condition "Passed" or "Normal"?</p>	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	<p>Determine if the device has any physical damage that makes this component repair impossible.</p> <p>Is the device eligible for a component repair?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE

	Check	Result	Action	Code	Commodity
5.	Follow Service Guide steps to open device and attempt battery removal.  If you have not yet replaced the battery in the user's device, then answer "Yes" to the question below to begin a repair and order the battery.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.  Run diagnostics to verify issue is resolved.	B8A	IPHONE COMP BATTERY
	<b>Warning:</b> If the battery tab breaks off or is otherwise not able to be removed, then do not use tools to pry up battery. In this situation, answer "No" to the question below.  Was battery removal successful without the battery tab breaking?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE
6.	Use diagnostics to determine usage and standby time.	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
	If usage time is the same as standby time, then the device has not been able to go to sleep because of active use or something else preventing the device from sleeping.  <b>Note:</b> The device is awake whenever the display is on, or when the user is making or receiving a call, using apps, listening to music, browsing the web, sending or receiving email, using location services such as GPS, or when an app is refreshing in the background.  Are usage times and standby times equal?	No	Go to step 7.	`\${nodeText.noSymptomCode}`	
7.	View MRI diagnostic results to determine any crashing apps that may be draining the battery.	Yes	Go to step 8.	`\${nodeText.yesSymptomCode}`	
	<b>Note:</b> It is generally not necessary to force an app to close unless the app is unresponsive. Refer to <a href="#">HT202070: Switch apps on your iPhone, iPad, or iPod touch</a> for instructions to view recently used apps. Recently used apps are not open. Recently used apps are in a suspended state.  Are there any crashing apps listed in diagnostic results?	No	Go to step 9.	`\${nodeText.noSymptomCode}`	

	Check	Result	Action	Code	Commodity
8.	Restart the device. If the device does not restart, try to reset it.	Yes	Go to step 11.	\$(nodeText.yesSymptomCode)	
	<p>Have the user use the device for several minutes, then allow the device to sleep for several minutes.</p> <p>Note battery level before and after usage to determine if battery life issue persists.</p> <p>Does battery life issue persist?</p>	No	<p>Issue resolved by restarting or resetting device.</p> <p>Advise the user to follow steps in <a href="#">HT201398: If an app unexpectedly quits, stops responding, or won't open.</a></p>	\$(nodeText.noSymptomCode)	
9.	Run the Battery Usage diagnostic suite in AST 2.	Yes	Go to step 10.	\$(nodeText.yesSymptomCode)	
	<p>Check diagnostic results to look for any apps that may be consuming large amounts of battery power.</p> <p>If AST 2 is not available, then go to Settings &gt; Battery and look for any apps that may be consuming unusually large amounts of battery power.</p> <p>Are there any apps listed that show unusually high battery usage?</p>	No	<p>Unable to duplicate issue.</p> <p>Refer the user to <a href="http://www.apple.com/batteries">www.apple.com/batteries</a> to learn about optimizing battery settings.</p>	\$(nodeText.noSymptomCode)	
10.	For each app that shows unusually high battery usage, ask the user how often and how long the app is used.	Yes	<p>Issue resolved.</p> <p>Refer the user to <a href="http://www.apple.com/batteries">www.apple.com/batteries</a> to learn about optimizing battery settings.</p>	\$(nodeText.yesSymptomCode)	
	<p>Explain to the user that the battery issue could likely be caused by the user using the app continuously over a long period of time, rather than any fault of the app itself, iOS, or the device.</p> <p>Gain agreement from the user that lengthy app usage is likely to be the cause of the battery life issue, and that there is no service issue with the device itself.</p> <p>Does the user agree that the battery life issue is likely caused by lengthy app usage?</p>	No	Go to step 11.	\$(nodeText.noSymptomCode)	



	Check	Result	Action	Code	Commodity
11.	<p>Follow steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a>.</p> <p><b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 13.	`\${nodeText.yesSymptomCode}`	
		No	Go to step 12.	`\${nodeText.noSymptomCode}`	
12.	<p>Perform steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 13.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
13.	<p>Advise user to follow steps in <a href="#">HT202033: Set up your iPhone, iPad, or iPod touch</a> to set up the device as a new device.</p> <p>Have user use device for several minutes, then allow the device to sleep for several minutes.</p> <p>Note battery level before and after usage to determine if battery life issue persists after restoring the device.</p> <p>Does battery life issue persist?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE
		No	<p>Issue resolved by restoring the device to the latest version of iOS.</p> <p>Advise the user to follow steps in <a href="#">HT201398: If an app unexpectedly quits, stops responding, or won't open</a>.</p>	`\${nodeText.noSymptomCode}`	

# Battery Will Not Charge

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Battery will not charge from a USB Power Adapter</li><li>Battery charge icon does not show that device is fully charged</li><li>Device turns off immediately after disconnecting a power adapter</li></ul>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p><b>Important:</b> Before servicing a device, ensure that the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a> for more information.</p> <p>If Activation Lock cannot be disabled normally due to the device not turning on, you may need to turn off Activation Lock through iCloud.com.</p> <ol style="list-style-type: none"><li>If the device is unresponsive or if certain controls are not working as expected, then restart the device. If the device does not turn on, then reset it.</li><li>Follow the steps in <a href="#">HT201569: If your iPhone, iPad, or iPod touch won't charge</a>.</li><li>Follow the steps in <a href="#">HT208078: How to wirelessly charge your iPhone X, iPhone 8, or iPhone 8 Plus</a>.</li><li>Check that the correct USB power adapter is being used to charge the device. Other power adapters may not provide enough power to charge the device.</li><li>Plug the device into a known-good 10W or 12W Apple USB Power Adapter and Lightning to USB Cable to charge the battery. Allow up to 10 minutes for the device to respond. Refer to <a href="#">TP325: Charge Battery</a> for more information.</li><li>Try the Lightning connector in both orientations.</li></ol> <p><b>Important:</b> Battery and charge indicators can fluctuate briefly when you connect the device to power or wake it from sleep. If this occurs, wait a few seconds and then check again. Battery percentage can remain at 99 percent with a full charge. This is expected behavior and does not indicate a battery or hardware issue.</p> <ol style="list-style-type: none"><li>If any of the above checks indicate that the device has no power and does not turn on, then return to the service guide table of contents and select “No Power” from the troubleshooting section.</li><li>If the user's device is running iOS 11.3 or later, refer to <a href="#">HT208387: iPhone Battery and Performance</a> to view battery health in Settings &gt; Battery &gt; Battery Health (Beta).</li></ol>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Inspect the area in and around the side button on the user's device. If you can see any damage or debris, answer "Yes" to the question here.</p> <p>If the side button is either stuck or cannot be pressed, check for the following:</p> <ul style="list-style-type: none"> <li>Substance causing button to be stuck in one position</li> <li>Debris blocking button so you cannot press button</li> <li>Physically broken button</li> </ul> <p>Is the side button stuck, blocked by debris, or physically broken?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	<p>Check the Lightning connector for debris obstruction. Follow steps in <a href="#">TP320: iPhone, iPad, iPod: Cleaning Procedures</a> to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
	<p>Plug the device into a known-good 10W or 12W Apple USB Power Adapter and Lightning to USB Cable to charge battery.</p>	Charging Screen / Black Screen	Go to step 21.	\${nodeText.yesSymptomCode}	



	Check	Result	Action	Code	Commodity
6.	Run AST 2 MRI diagnostic suite to verify battery condition.	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
	Check diagnostic results for a result of "Passed" or "Normal."	No	Go to step 7.	\${nodeText.noSymptomCode}	
	Do not restore the user's device before running AST 2.				
	Is the battery condition "Passed" or "Normal"?				
7.	Determine if the device has any physical damage that makes a component repair impossible.  Is the device eligible for a component repair?	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE
8.	Follow Service Guide steps to open device and attempt battery removal.  If you have not yet replaced the battery in the user's device, then answer "Yes" to the question below to begin a repair and order the battery.  <b>Warning:</b> If the battery tab breaks off or is unremovable, then do not use tools to pry up battery. In this situation, answer "No" to the question below.  Was battery removal successful without the battery tab breaking?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.  Run diagnostics to verify issue is resolved.	B8A	IPHONE COMP BATTERY
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE

	Check	Result	Action	Code	Commodity
9.	Check the battery icon in the upper right-hand corner of the screen.  Is device currently charging?	Yes	Go to step 12.	\$(nodeText.yesSymptomCode)	
		No	Go to step 10.	\$(nodeText.noSymptomCode)	
10.	Follow the steps in <a href="#">HT201252: Restore your iPhone, iPad, or iPod to factory settings</a> to restore the device using the latest version of iTunes. If the restore fails, attempt a recovery mode restore. See <a href="#">TP337: iOS: Recovery Mode Restore</a> .  <b>Warning:</b> Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.  Did the restore complete?	Yes	Go to step 12.	\$(nodeText.yesSymptomCode)	
		No	Go to step 11.	\$(nodeText.noSymptomCode)	
11.	Follow the steps in <a href="#">HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</a> and <a href="#">HT204770: Get help with iOS update and restore errors</a> to attempt to restore the device.  Did the restore complete?	Yes	Go to step 12.	\$(nodeText.yesSymptomCode)	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
12.	Allow the device to charge for two more minutes, then unplug the device.  Did the device immediately turn off?	Yes	Go to step 24.	\$(nodeText.yesSymptomCode)	
		No	Go to step 13.	\$(nodeText.noSymptomCode)	
13.	Test the device with the user's Apple accessory, if available.  Does the user have their Apple USB Power Adapter, Lightning to USB Cable, and wireless charger?	Yes	Go to step 14.	\$(nodeText.yesSymptomCode)	
		No	Issue resolved.  Remind the user to verify the functionality of their power adapter, Lightning to USB cable, and wireless charger that are used to charge the device.	\$(nodeText.noSymptomCode)	
14.	Connect the user's USB Power Adapter with a known-good Apple Lightning to USB cable.  Does the device charge?	Yes	Go to step 16.	\$(nodeText.yesSymptomCode)	
		No	Go to step 15.	\$(nodeText.noSymptomCode)	

	Check	Result	Action	Code	Commodity
15.	Connect a known-good USB Power Adapter with user's Lightning to USB cable.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
	When testing the user's Lightning to USB cable, try connecting the cable in both orientations, and bend the cable to ensure there is no intermittent connection within the cable.		If the adapter is not made by Apple, refer user to manufacturer for support.		
	Does the device charge?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B83	IPHONE
16.	Inspect the user's Lightning to USB Cable.	Apple	Go to step 17.	\${nodeText.yesSymptomCode}	
	Refer to <a href="#">HT204566: Identify counterfeit or uncertified Lightning connector accessories</a> to inspect the user's Lightning to USB Cable to ensure it is made by Apple or a certified third party.	Third Party	Issue resolved.  Refer the user to cable manufacturer for support.	\${nodeText.noSymptomCode}	
	Is the user's Lightning to USB cable made by Apple or a certified third party?				

	Check	Result	Action	Code	Commodity
17.	<p>Connect a known-good USB Power Adapter with the user's Lightning to USB cable.</p> <p>When testing the user's Lightning to USB cable, try connecting the cable in both orientations, and bend the cable to ensure there is no intermittent connection within the cable.</p> <p>Does the device charge?</p>	Yes	Go to step 18.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
18.	<p>Check MRI diagnostic results to verify the presence of wireless charging hardware.</p> <p>If AST 2 is not available, then follow the steps in <a href="#">TP1045: iPhone Functional Test</a> to test wireless charging functionality.</p> <p>Does MRI detect wireless charging?</p>	Yes	Go to step 19.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B86	IPHONE
19.	<p>Connect the user's device to a known-good wireless charger.</p> <p>Be sure to disconnect the wired charging cable before testing wireless charging. Charging will default to the wired connection if both are used simultaneously.</p> <p>Follow the steps in <a href="#">HT208078: How to wirelessly charge your iPhone X, iPhone 8, or iPhone 8 Plus</a>.</p> <p>Does the device charge?</p>	Yes	Go to step 20.	`\${nodeText.yesSymptomCode}`	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B86	IPHONE



	Check	Result	Action	Code	Commodity
20.	<p>Connect the user's device to the user's wireless charger.</p> <p>Does the device charge?</p>	Yes	Issue cannot be duplicated.	#{nodeText.yesSymptomCode}	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>If the charger is not made by Apple, refer user to manufacturer for support.</p>	B09	IPHONE ACCESSORY
21.	<p>Identify if the image seen on the user's device is the charging screen or a black screen.</p> <p>Do you see a charging screen or a black screen?</p>	Charging Screen	Go to step 22.	#{nodeText.yesSymptomCode}	
		Black Screen	Go to step 23.	#{nodeText.noSymptomCode}	
22.	<p>Allow the device to charge for two more minutes, then unplug the device.</p> <p>Did the device immediately turn off?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B83	IPHONE
		No	Go to step 23.	#{nodeText.noSymptomCode}	
23.	<p>Charge the device for up to 10 minutes, or until the device wakes to a display, whichever comes first.</p> <p>Did the device wake to an iOS screen?</p>	Yes	Go to step 6.	#{nodeText.yesSymptomCode}	
		No	Go to step 24.	#{nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
24.	<p>1. Open the device. 2. Inspect the battery connector to ensure that it is fully seated onto logic board.</p> <p>Is battery connector fully seated?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B83	IPHONE
		No	Go to step 25.	\$(nodeText.noSymptomCode)	
25.	<p>If the battery connector is either disconnected or partially seated, then disconnect the battery connector and inspect for damage.</p> <p>Look for damage on both the battery cable and the logic board connectors.</p> <p>Is any damage found on the battery connector?</p>	Yes	This device has unauthorized modifications. Document test failure, process a repair. Return the device to the user.	\$(nodeText.yesSymptomCode)	
		No	Go to step 26.	\$(nodeText.noSymptomCode)	
26.	<p>Reconnect the battery connector to the logic board, ensuring that the connector is fully seated onto the logic board.</p> <p>Retest: Allow the device to charge for two more minutes, then unplug the device.</p> <p>Did the device immediately turn off?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B83	IPHONE
		No	Issue resolved.	\$(nodeText.noSymptomCode)	

# No Power

## Unlikely causes:

There are no unlikely causes for this issue.

## Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"><li>Will not turn on</li></ul>	<p><b>Important:</b> Before servicing a device, ensure the user has disabled Find My iPhone in Settings. Refer to <a href="#">HT201365: Find My iPhone Activation Lock</a>.</p> <p>If Activation Lock cannot be disabled normally due to the device not turning on, you may need to turn off Activation Lock through iCloud.com.</p> <ol style="list-style-type: none"><li>Connect the device using a known-good Lightning cable to a known-good computer running the latest version of iTunes. If the device is recognized in iTunes, then the device has power. Restore the device if prompted.</li></ol> <p><b>Important:</b> If the user's device is running iOS 11.4.1 or later, the following will occur unless you connect the device to iTunes while it is unlocked or in recovery mode, or you enter the device's passcode while it's connected:</p> <ul style="list-style-type: none"><li>The device will not be recognized in iTunes.</li><li>The device will not communicate with USB accessories.</li><li>The device will appear to have no power.</li></ul> <p>Attempt to place the device in recovery mode to verify if it can turn on. Refer to <a href="#">TP337: iOS: Recovery Mode Restore</a> for instructions. Refer to <a href="#">HT208857: Using USB accessories with iOS 11.4.1 and later</a> for more information.</p> <ol style="list-style-type: none"><li>Plug the device into a known-good 10W or 12W Apple USB power adapter that is connected to AC power until an image appears on the screen, or for up to 10 minutes, whichever comes first. If the device charges or an image appears on screen, then the device has power. If the device does not charge or no image appears on screen after 10 minutes of charging, then continue to the next step. Refer to <a href="#">TP325: Charge Battery</a> for more information.</li><li>Follow steps in <a href="#">TP330: Reset</a> to reset the device. If an image appears on screen, then the device has power.</li><li>Reconnect the device using a known-good Lightning cable to a known-good computer running the latest version of iTunes. If the device is recognized in iTunes, then the device has power. Restore the device if prompted.</li><li>Follow steps in <a href="#">HT201412: If your iPhone, iPad, or iPod touch won't turn on or is frozen</a>.</li></ol> <p><b>Note:</b> If any of the above checks indicate that the device has power and turns on, then go back and select another troubleshooting article.</p>

## Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p><b>Important:</b> Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Complete all steps in the internal inspection section of the VMI Guide.</p> <p><b>Important:</b>  <u>For mail-in repairs only:</u>            Do not perform an internal inspection unless the externally visible liquid contact indicator (LCI) has been triggered, or is damaged or missing: the depot will perform an internal inspection of the components as well as a microinspection, if necessary.</p> <p><u>For whole unit swaps in store:</u>            Perform VMI checks and any relevant microinspections, including an internal liquid damage check.</p> <p>Did the user's device pass all tests in this procedure?</p>	Yes	Whole unit service required. Proceed with repair creation to see available options. Covered if under warranty. Check for out-of-warranty repair options.	B83	IPHONE
		No	<p>This device has unauthorized modifications. Return the device to the user.</p> <p><u>Instructions for AASPs:</u>            Document test failure, process a repair, use part number 011-0659 Micro-Inspection 1.</p> <p><u>Instructions for Apple Retail:</u>            Document test failure by attaching photos to Service Non-Repair Case, use part number S4981Z/A SVC, MI SCREENING.</p>	\${nodeText.noSymptomCode}	

# Take-Apart General Information

## Before You Begin

- **Important:** Refer to the Visual/Mechanical Inspection (VMI) Guide to determine whether the device has any accidental damage. Check for liquid contact indicator (LCI) activation before opening the device. One externally visible LCI can be viewed by removing the SIM tray.
- Remove any cases or screen protectors, as they may inhibit proper testing.
- Verify the user-reported symptoms and identify the parts needed for repair.
- Drag the slide to power off slider to ensure that the device is turned off.

## Electrostatic Discharge (ESD) Precautions

Always take proper ESD precautions when opening iPhone. Make sure you work on a properly grounded ESD-safe mat and wear a properly connected ESD-safe wrist strap.

Refer to the following articles for more ESD information:

- [OP100: Electrostatic Discharge Precautions and Myths](#)
- [ATLAS: ESD Precautions](#)

## Required Tools

Servicing iPhone 6 and later (excluding iPhone SE) requires the following tools:

- ESD-safe brush (922-9918)
- ESD-safe tweezers
- ESD-safe wrist strap
- ESD-safe workstation
- 4.7-inch Repair Tray\* (923-02836)
- 5.5-inch Repair Tray\* (923-02837)
- 5.8-inch Repair Tray\* (923-02661)
- 6.5-inch Repair Tray\* (923-02662)
- iPhone Battery Fixture (923-02657)
- Torque driver (blue), 0.65 kgf-cm (923-0448)
- Torque driver (gray), 0.55 kgf-cm (923-00738)
- Torque driver (green), 0.45 kgf-cm (923-00105)
- Torque driver kit (923-0248) includes:
  - Torque driver (black), 0.35 kgf-cm
  - Torx security bit (923-0247)
  - JCIS bit for crosshead screws(923-0246)
- MicroStix bit (923-01290)
- Superscrew bit (923-01289)
- 2.1 mm superscrew bit (923-02066)
- Microfiber polishing cloth
- Motorola DS4208 scanner (923-0445)
- Black stick (922-5065)
- Packing tape
- SIM removal tool (922-8417) or paper clip (size #1)
- Universal Display Removal Fixture (923-00066)

Servicing iPhone 6s and later requires the following additional tools:

- Universal Display Removal Adapter (923-00652)
- Display Press (661-08916)
- Adhesive Cutter (923-01915)
- Replacement Wheels for Adhesive Cutter (923-01916)

Refer to [OP1082: Hand tools for repairs](#) for more details.

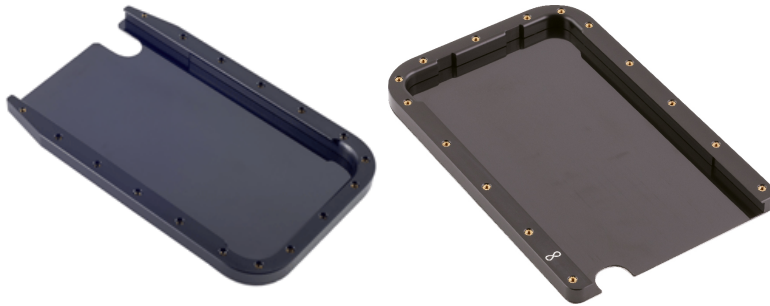
\*The following repair trays are marked with a symbol in the upper-right corner:

- 4.7-inch Repair Tray: hexagon
- 5.5-inch Repair Tray: diamond
- 5.8-inch Repair Tray: plus sign

- 6.5-inch Repair Tray: infinity symbol



Use the support frame when the back glass is broken on iPhone 8 or later. **Important:** Apply Back Protective Cover before placing the device in the support frame.



# Device Safety

## Battery Handling

iPad, iPhone, iPod, and Apple Watch include a lithium-polymer rechargeable battery. When the battery is used and repaired under reasonable conditions and according to instructions, it should not present a health hazard. The contents of the battery are encapsulated. However, if the contents are released or damaged, they may present potential health and safety hazards. Avoid exposure to heat and open flame. Do not puncture, deform, crush, or incinerate a battery, as a thermal runaway reaction and excessive heating may result. Refer to [OP24: Safely handling lithium batteries and lithium battery-powered devices](#). Refer to the Workstation and Special Tools section of [OP685: About embedded battery safety](#) for workstation setup and special battery handling tools.



**Warning:** If the battery is dented, punctured, swollen, or otherwise damaged, then stop the repair. Do not remove the battery from the device. Replace the whole unit.

For further swollen battery instructions, including warranty coverage, refer to [HT204762: Enclosure separation due to expanded battery](#).

**Warning:** Do not reuse or reinstall a loose battery or a battery that has been removed. Replace it with a new battery. If a new battery is unavailable, replace the whole unit.

## Thermal Runaway Events Involving Lithium-Ion (LiO) / Lithium-Polymer Batteries

The following statements are intended as guidance only. Only properly trained and equipped personnel should respond to a thermal runaway event.

The most effective way to prevent a lithium-ion/lithium-polymer battery thermal event is to discharge the battery before opening the device or working on or near the battery. (A battery with a charge of less than 25 percent is unable to produce a thermal event.)

If a battery begins to emit smoke or sparks, or if you hear hissing or popping sounds, the battery is most likely undergoing a thermal runaway. The most effective way to stop the reaction is to immediately smother the battery with plenty of clean, dry sand. As soon as you notice that a battery thermal event is underway, pour all of the sand, all at once, over the battery to cover it completely. This will smother the reaction and limit the amount of smoke produced.

Do not attempt to use water or an ABC/CO2 fire extinguisher on a thermal runaway battery, as these methods will not effectively stop the reaction and will create a bigger mess to clean up.

## Cleanup

Sweep up sand (if used), remove any pieces of debris, and return the remaining clean sand to the quick-pour container for future use. Add more sand to the container from supplementary sand containers as needed.

Wipe the workstation with water. Use an ESD-mat cleaning solution on the affected area.

Return batteries (including any debris removed from the sand, if it was used) according to Apple Recycles and scrap procedures.

## Personal Protection

<b>Respiratory Protection</b>	Not necessary under normal conditions.
<b>Eye/Face Protection</b>	Always wear safety glasses with side shields when performing repair work involving batteries, broken glass, or any task where eye hazards could be present.
<b>Gloves</b>	Not necessary under normal conditions. Use disposable latex or nitrile gloves if handling an open or leaking battery.

## First Aid Measures

<b>Inhalation</b>	The contents of an open battery or the smoke from a thermal runaway event may cause respiratory irritation. Leave the area if necessary for comfort. Seek fresh air and medical attention if you are feeling unwell.
<b>Ingestion</b>	Ingestion of a lithium-ion battery is highly unlikely as the contents are mostly solid, and any free liquid (ester-based electrolyte) that might drip out of a damaged battery is limited to a few drops. However, care should be taken not to touch your fingers to your mouth while handling a damaged battery to avoid ingesting contents. Do not induce vomiting. Wash out mouth with water. Get medical attention following exposure or if you are feeling unwell.
<b>Skin Contact</b>	The contents of an open battery may cause skin irritation. Flush contaminated skin with plenty of water. Remove any contaminated clothing. Continue to rinse skin for at least 15 minutes. Get medical attention. Wash clothing before reuse.
<b>Eye Contact</b>	The contents of an open battery may cause eye irritation. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Remove any contact lenses. Continue to rinse your eyes for at least 15 minutes. Get medical attention if irritation persists.

**Disclaimer:** The above information is provided for your information only. The information and recommendations set forth above are made in good faith and are believed to be accurate as of the date of preparation. Apple Inc. makes no warranty, either expressed or implied, with respect to this information and disclaims all liability from reliance on it.

## Broken Glass Handling

iPad, iPhone, iPod, and Apple Watch displays and iPhone 4, 4s, 8, 8 Plus, and X back covers are made of glass. This glass could break if the device is dropped on a hard surface, receives a substantial impact, or is crushed, bent, or deformed. If the glass chips or cracks, do not attempt to remove the broken glass. Follow these steps:

- If the display glass is broken, put on safety glasses and cut-resistant gloves.
- Use a vacuum to remove any glass shards present on the work surface or the display.
- Affix a protective display cover or packing tape to the display before removal to prevent injury or scattering of glass.
- Do not let the display cover or tape go over the edge of the display.
- Refer to the appropriate Visual/Mechanical Inspection (VMI) Guide for repair options:
  - [VMI Guide for Apple Watch](#)
  - [VMI Guide for iPad](#)
  - [VMI Guide for iPhone 4 and 4s](#)
  - [VMI Guide for iPhone 5, 5c, 5s, and SE](#)
  - [VMI Guide for iPhone 6, 6 Plus, 6s, 6s Plus, 7, 7 Plus, 8, 8 Plus](#)
  - [VMI Guide for iPhone X, Xs, and Xs Max](#)
  - [VMI Guide for iPod touch \(5th and 6th generation\)](#)
  - [VMI Guide for iPod nano \(6th and 7th generation\)](#)
  - [VMI Guide for iPod \(all other models\)](#)

## Recent changes to this procedure:

**21 SEP 2018:** Added iPhone Xs and iPhone Xs Max.

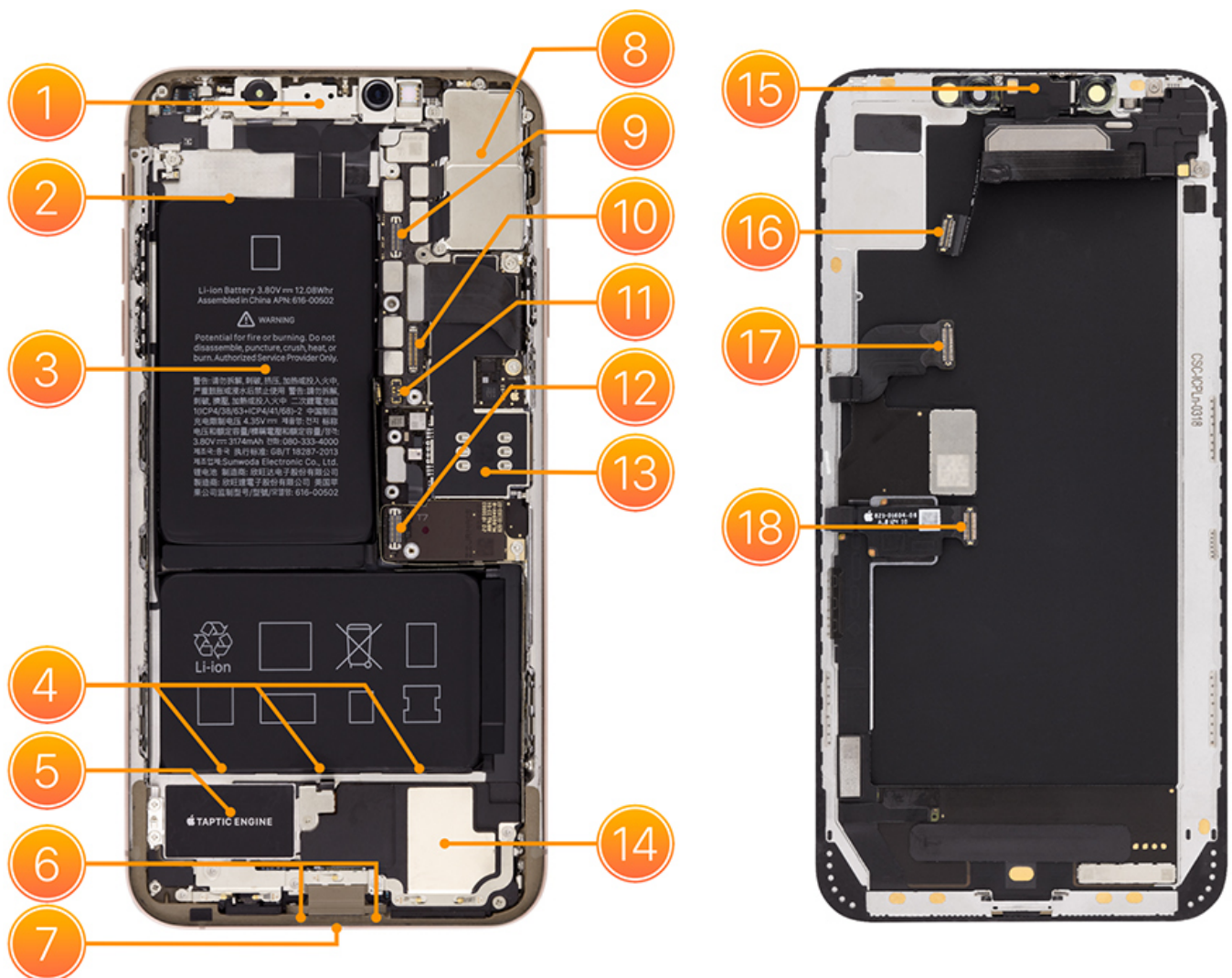
**03 NOV 2017:** Added iPhone X. Updated Eye/Face Protection section.

**22 SEP 2017:** Added iPhone 8 and 8 Plus.



# Internal View, Parts List, Screw Diagram

## Internal View of iPhone Xs Max



1. TrueDepth camera assembly
2. Battery adhesive tab
3. Battery
4. Battery adhesive tabs
5. Taptic Engine
6. Bottom microphones
7. Lightning connector
8. Cameras
9. Receiver/ambient light sensor/proximity connector
10. Display connector
11. Battery connector
12. 3D Touch / Multi-Touch connector
13. SIM reader
14. Speaker
15. Receiver
16. Receiver/ambient light sensor/proximity flex
17. Display flex
18. 3D Touch / Multi-Touch flex

## Parts List

Description	Part Number	Kit Contents (order screws separately)	Screws
Battery Kit	661-11035	1 battery 1 battery adhesive pack	
Battery Shield	923-02835	48 battery shields	
Camera	661-11036	1 camera	
Camera Cowling	923-02686	10 cowlings	923-02687 upper 923-02688 lower
Display	661-11037	1 display 1 screw kit	
Display Adhesive	923-02659	30 display adhesive sheets <b>Important:</b> Adhesive expires after one year and should be discarded. Each box of adhesive has a (9D) number on the top right corner of the part label. The first two numbers indicate the year and the second two numbers indicate the week. The expiration date is one year from the date in the (9D) number.	
Lower Cowling	923-02674	10 lower cowlings	923-02680
Middle Cowling	923-02690	10 middle cowlings	923-02692 top and middle 923-02694 bottom
Security Screws		100 screws	923-02833 space gray 923-02834 silver 923-02673 gold
SIM Tray	923-02828 single, space gray 923-02829 single, silver 923-02830 single, gold 923-02833 dual, space gray 923-02834 dual, silver 923-02655 dual, gold	1 SIM tray	
Speaker	923-02649	1 speaker	
Speaker Cowling	923-02677	10 speaker cowlings	923-02685
Taptic Engine	923-02682	1 Taptic Engine	923-02683
Upper Cowling	923-02691	10 upper cowlings	923-02693 upper left 923-02695 middle left 923-02694 upper right, lower right

### Screw Diagram

Use the iPhone torque driver (black) for screws marked with a black outline.  
Use the iPhone torque driver (green) for screws marked with a green outline.  
Use the iPhone torque driver (gray) for screws marked with a gray outline.





923-02684 0.55 kgfcm

923-02678 0.55 kgfcm

# iPhone Xs Max Repair Video List

The iPhone Xs Max features a new internal design. Watch the videos listed below to learn what's new and how to properly replace internal components in the course of a repair.

- [iPhone Xs Max Open Device Video](#)
- [iPhone Xs Max Camera Replacement Video](#)
- [iPhone Xs Max Speaker Replacement Video](#)
- [iPhone Xs Max Taptic Engine Replacement Video](#)
- [iPhone Xs Max Battery Replacement Video](#)

Email AppleCare Media Production at [servicevideos@group.apple.com](mailto:servicevideos@group.apple.com) for video content and playback issues.

**Note:** AppleCare Media Production reads every email but can't always respond.

# SIM Tray

## First Steps

- Turn off the device.

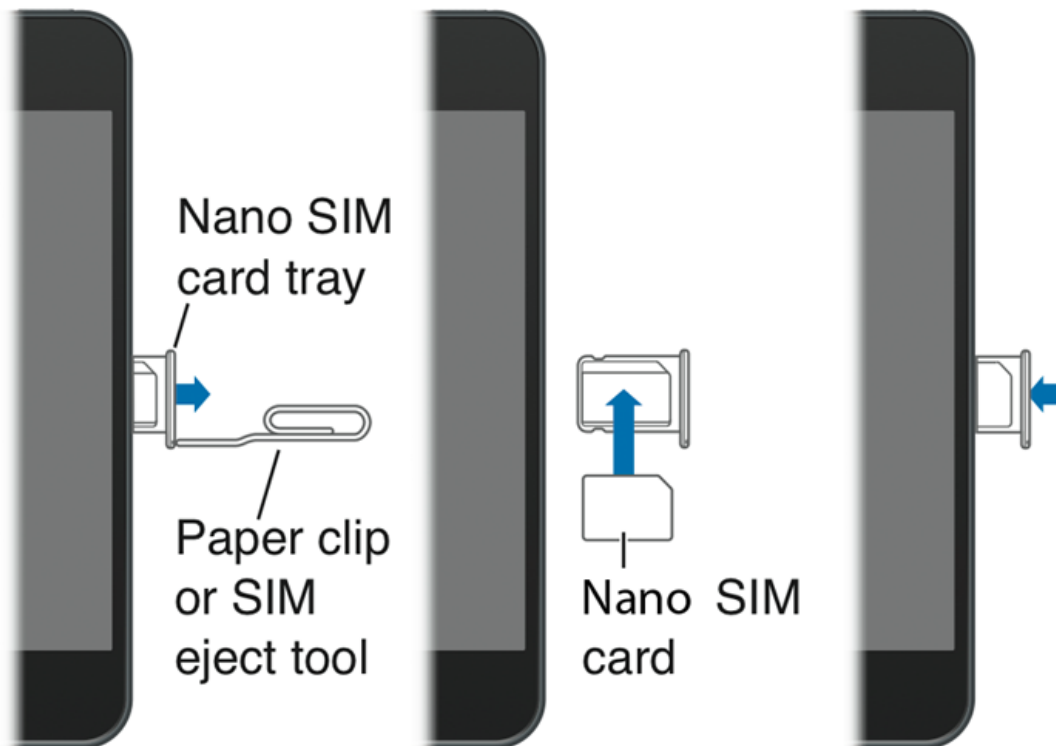


## Tools

- SIM removal tool (922-8417) or paper clip (size #1)

## Steps For Removal

1. Insert the end of the SIM removal tool (922-8417) or paper clip (size #1) into the hole on the SIM tray.
2. Firmly push the tool straight in to eject the tray.

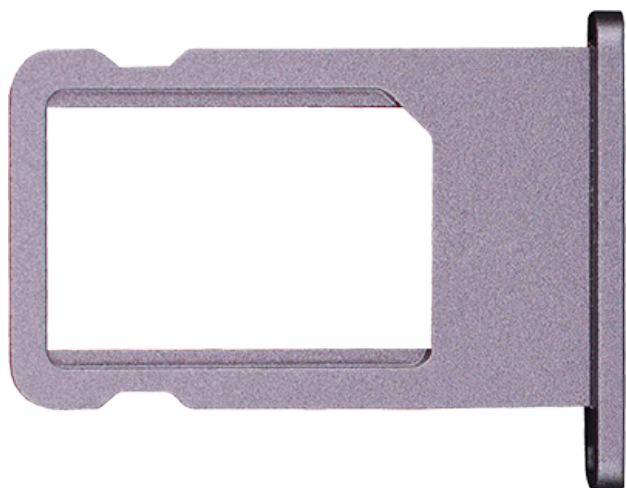


## Steps For Reassembly

Note the orientation of the SIM tray and card before inserting it into the device.

**Caution:** Do not force the SIM tray into position. Forcing the SIM tray into position may damage the inside of the device.





# iPhone Xs Max Open Device

## First Steps

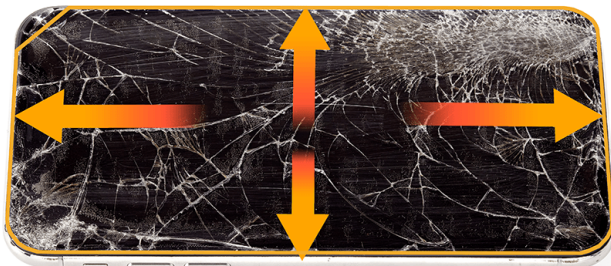
- Refer to the [Visual/Mechanical Inspection \(VMI\) Guide](#) to determine whether any accidental damage is present.
- Remove all cases and screen protectors.
- Follow electrostatic discharge (ESD) precautions.
- Turn off the device.



**Warning:** If the enclosure is separated due to a swollen battery, stop the repair. Do not remove the battery from the device. Replace the whole unit. Refer to [TP328: iPhone Safety](#) and [HT204762: Enclosure separation due to expanded battery](#).

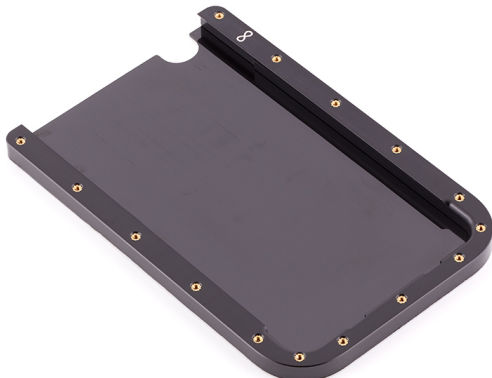
**Warning:** If the display glass is broken, put on safety glasses and material handling gloves. Use a vacuum cleaner to remove any glass shards from the workspace or the display. Affix a display protective cover or packing tape to the display before removal to prevent injury or scattering of glass. Do not install the protective display cover or tape over the edge of the display.

When installing a 6.5-inch Display Protective Cover (923-02758), firmly press the cover onto the broken display to remove air bubbles and work the adhesive into the cracks in the glass. The cover should be left to settle into place up to 12 minutes for more damaged displays before attempting to remove the display. The longer the display protective cover is left on the display, the stronger the bond between the cover and the broken glass.



If the back glass is broken, adhere a 6.5-inch Back Protective Cover (923-02668) before attempting a repair. If the protective cover does not adhere to the iPhone or if there is no glass for the film to adhere to, do not attempt a repair. Devices with this type of damage will require a whole unit replacement.

Then place the iPhone in the 6.5-inch support frame (923-02665) before attempting to open the device. If the device does not fit in the support frame, do not attempt a repair. Devices with this type of damage will require a whole unit replacement.



Refer to [SV380: iPhone Xs Max Open Device Video](#) for video instruction.





## Tools

1. Torque driver (black) (923-0248)
2. Torque driver (green) (923-00105)
3. Torque driver (gray) (923-00738)
4. Security bit (923-0247)
5. MicroStix bit (923-01290)
6. JCIS bit for crosshead screws (923-0246)
7. Black stick (922-5065)
8. Universal Display Removal Fixture (923-01385)
9. Universal Display Removal Adapter (923-00652)
10. Adhesive Cutter (923-01915)
11. 6.5-inch Repair Tray (923-02662)
12. Display Press (661-08916)



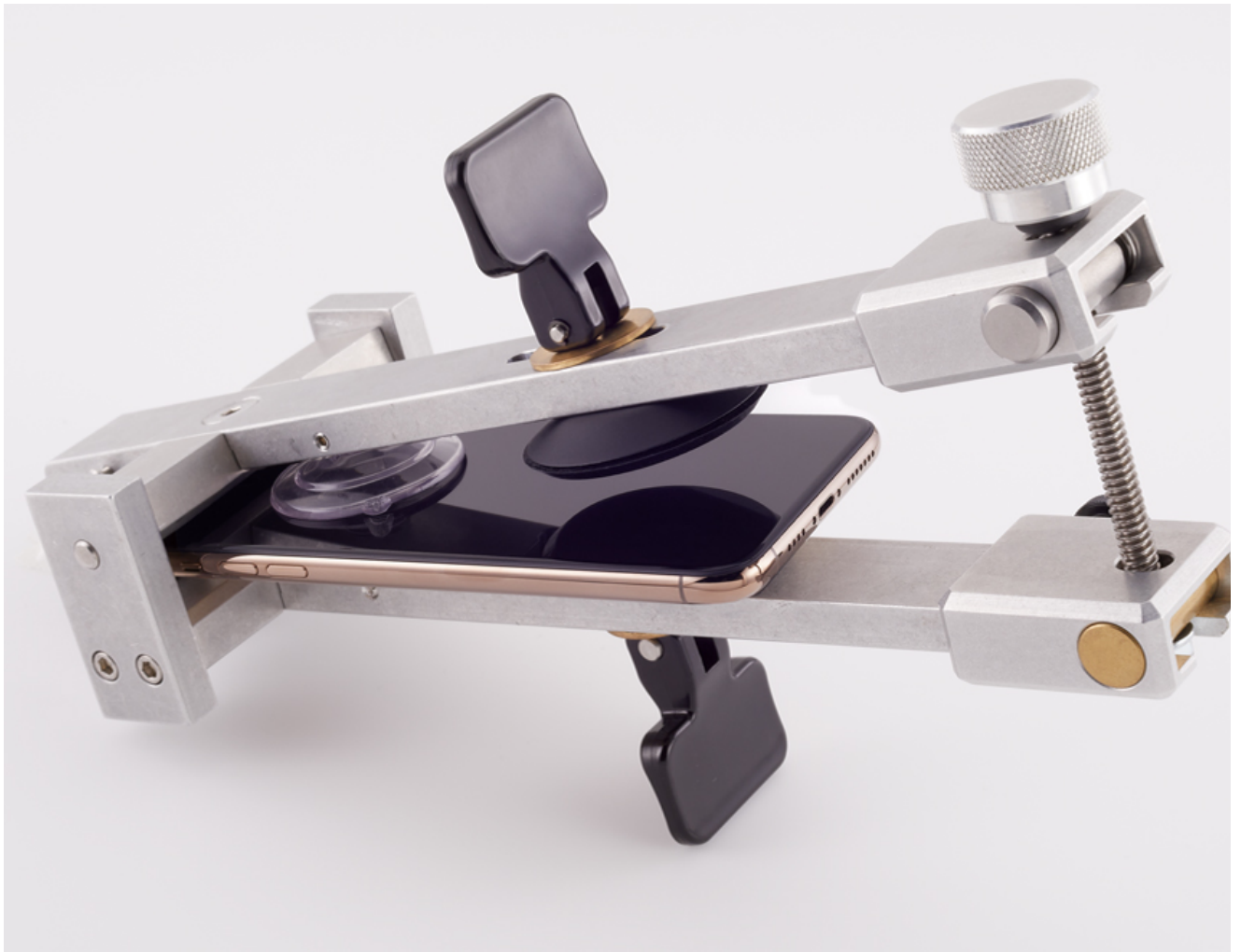
## Steps For Removal

1. Use a torque driver and security bit to remove and discard two security screws, one from each side of the Lightning connector.

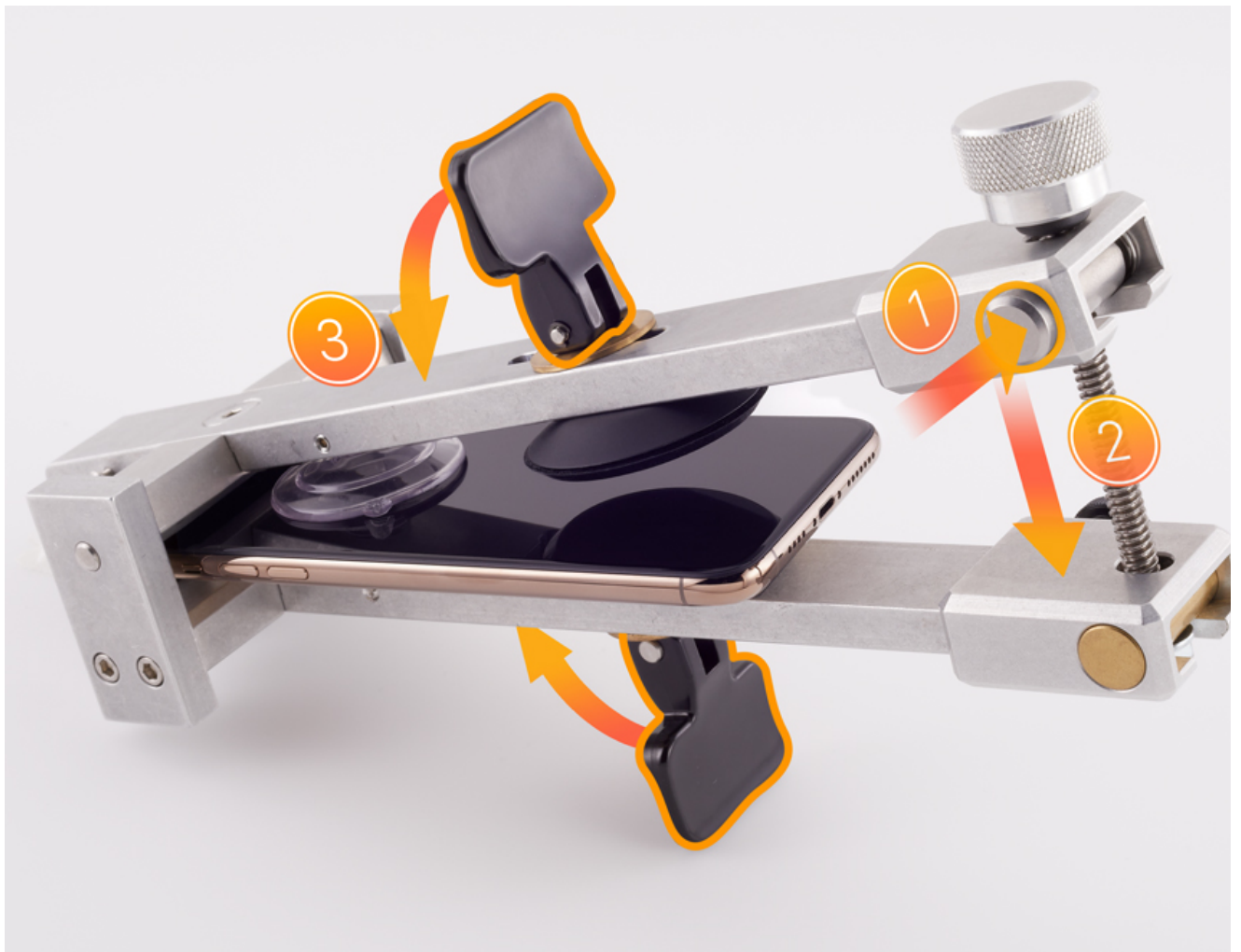


2. Secure the Universal Display Removal Adapter to the Universal Display Removal Fixture. Make sure the handles of the fixture are fully inserted into the adapter and the thumb screws are tight.
3. Adjust the suction cup to the farthest point from the pivot and as close to the bottom of the display without overlapping the edge. Adjust the suction cup on the back of the device to align with the position of the one on the display. Press the iPhone down to secure the lower suction cups.

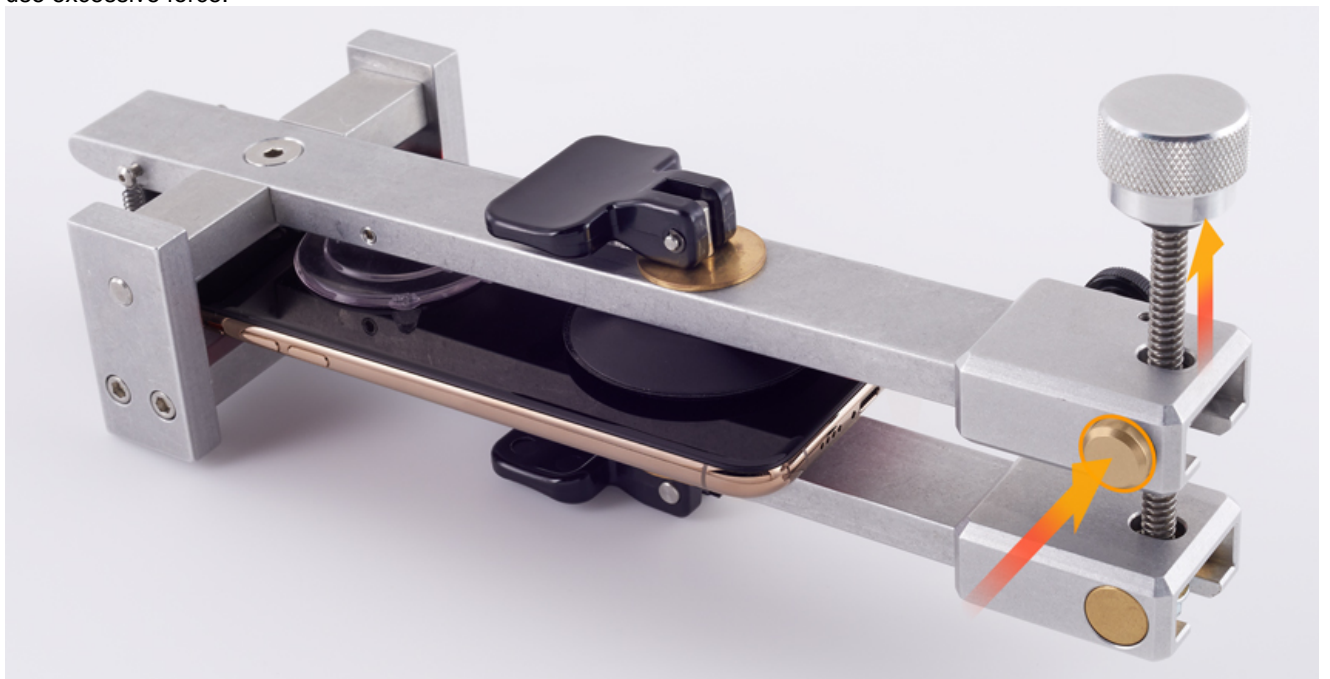
**Caution:** Use an updated Universal Display Removal Fixture and Universal Display Removal Adapter with iPhone Xs Max. Other fixtures may cause damage.



4. Press and hold the release button on the adapter, then press the lever down to secure the suction cups to the display glass.

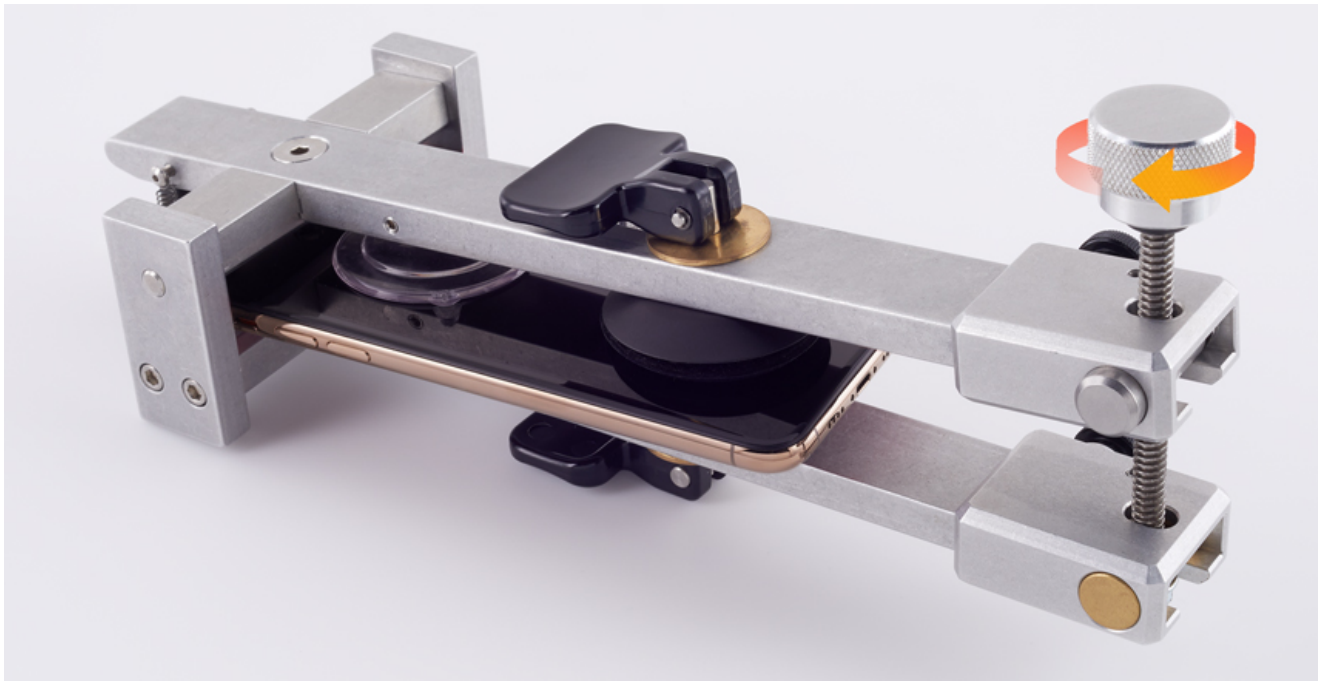


5. Press and hold the release button on the adapter, then slowly separate the metal bars until resistance is felt. Do not use excessive force.

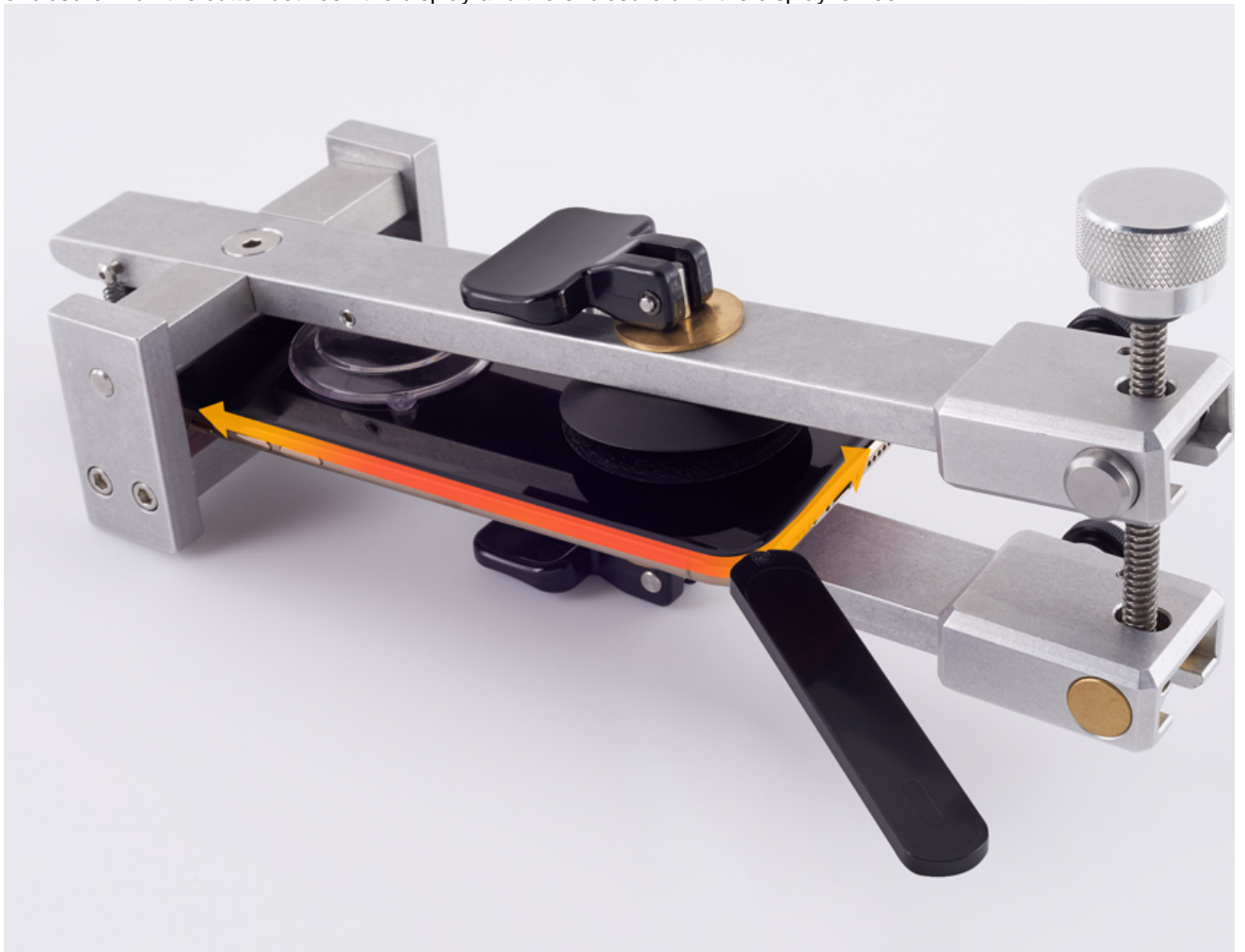


6. Slowly turn the knob on the adapter until the display begins to separate from the enclosure.





7. Insert the Display Adhesive Cutter between the display and the enclosure until the edge of the cutter is inside the enclosure. Run the cutter between the display and the enclosure until the display is free.



8. Loosen the four suction cups to release the display and the enclosure from the fixture. **Note:** The bottom suction cup may reattach when attempting to remove the iPhone.



9. Gently slide the display slightly toward the bottom of the device until the clips release, then tilt the bottom of the display up. **Caution:** Do not pry the display.



10. Insert the Display Adhesive Cutter between the display and the enclosure near the top of the display. Start in the middle. Run the cutter between the display and the enclosure until the display is free. **Note:** Use the cutter at the angle shown in the image.



**Important:** To avoid damaging the display flexes, do not tilt the display more than five degrees.



11. Place the suction cups in the repair tray. Then carefully lift the display away from the enclosure and tilt the display to the right.



**Caution:** Make sure that the display clips are released before tilting the display to avoid damage to the enclosure or display. Do not damage the display flexes while lifting the display.

**Warning:** If the battery is dented, punctured, swollen, or otherwise damaged, then stop the repair. Do not remove the battery from the device. Reassemble the device and replace the whole unit.

Refer to [TP328: iPhone Safety](#) and [HT204762: Enclosure separation due to expanded battery](#).



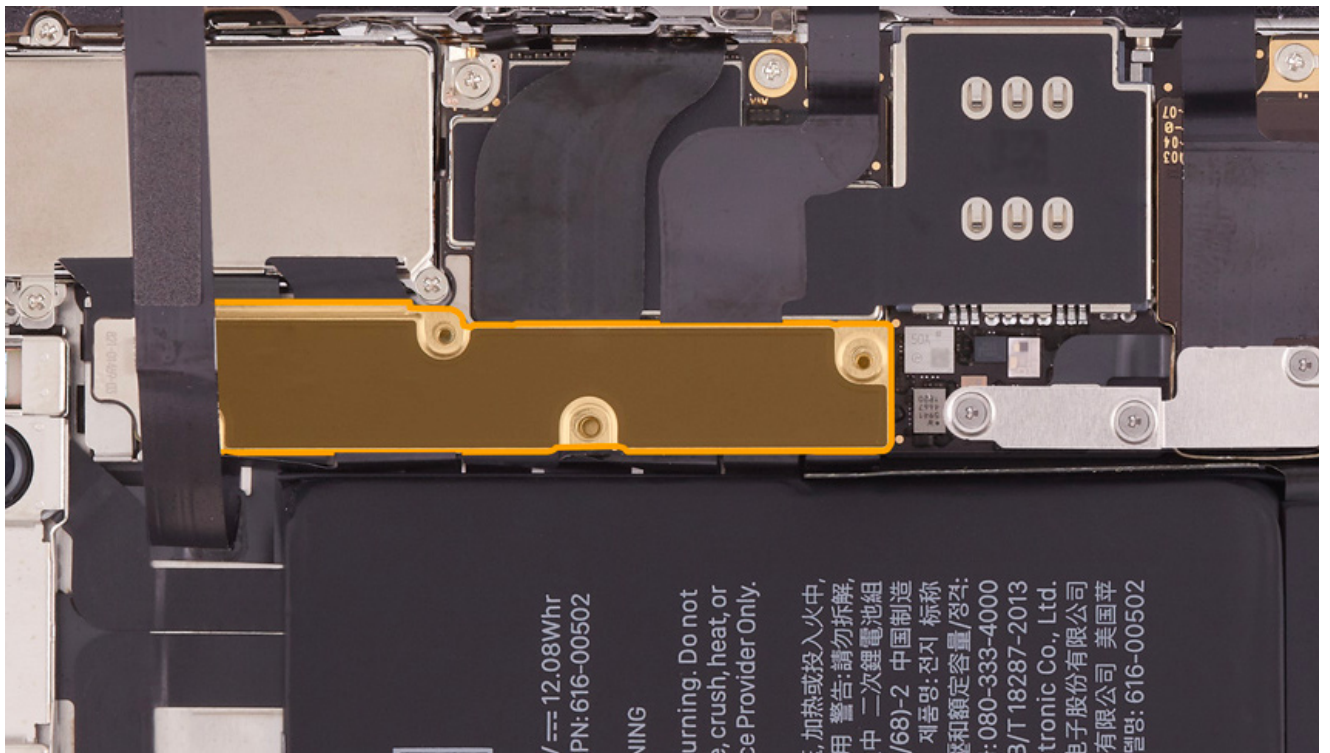


12. Use the torque driver and MicroStix bit to remove and discard four trilobe screws from the upper cowling. **Important:** Avoid touching the TrueDepth cameras and nearby components.



13. Remove the upper cowling and save it for reuse.





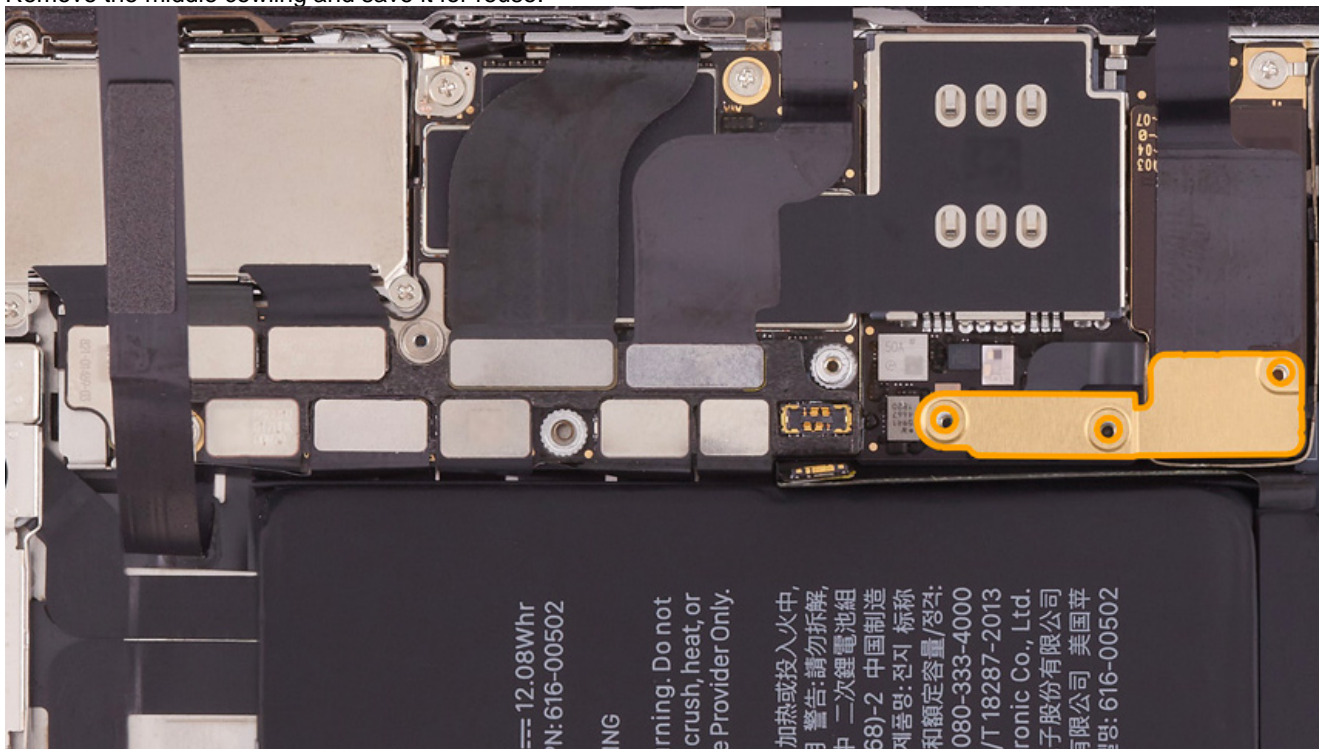
14. Use a black stick to disconnect the battery connector from the logic board.



15. Use the torque driver and MicroStix bit to remove three trilobe screws from the middle cowling.

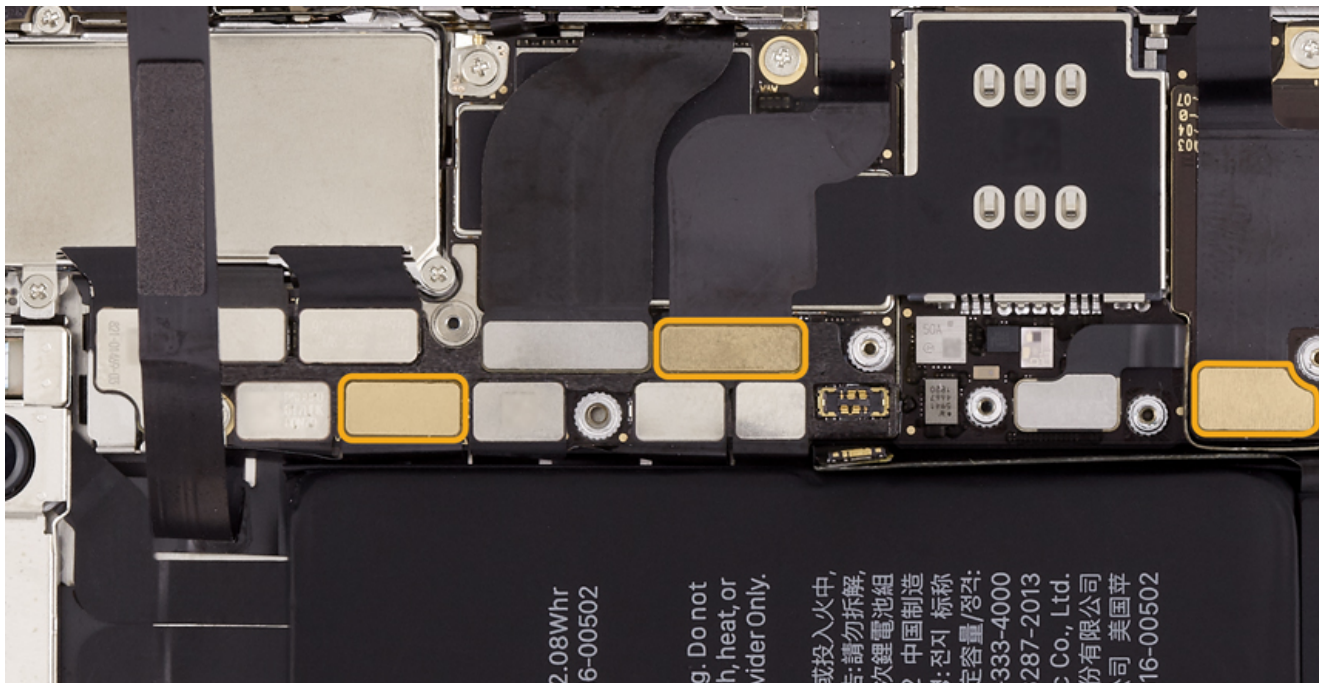


16. Remove the middle cowling and save it for reuse.



17. Use a black stick to disconnect the three display flex connectors. Gently separate the left flex from the adhesive on the enclosure.





18. Remove the display assembly from the enclosure.
19. Use a black stick to remove adhesive residue from the display and the enclosure. **Important:** Avoid all grounding springs.

**Important:** Clean the enclosure and the display to ensure a proper seal during reassembly. Refer to [SV380: iPhone Xs Max Open Device Video](#) for video instruction on the recommended adhesive removal method.

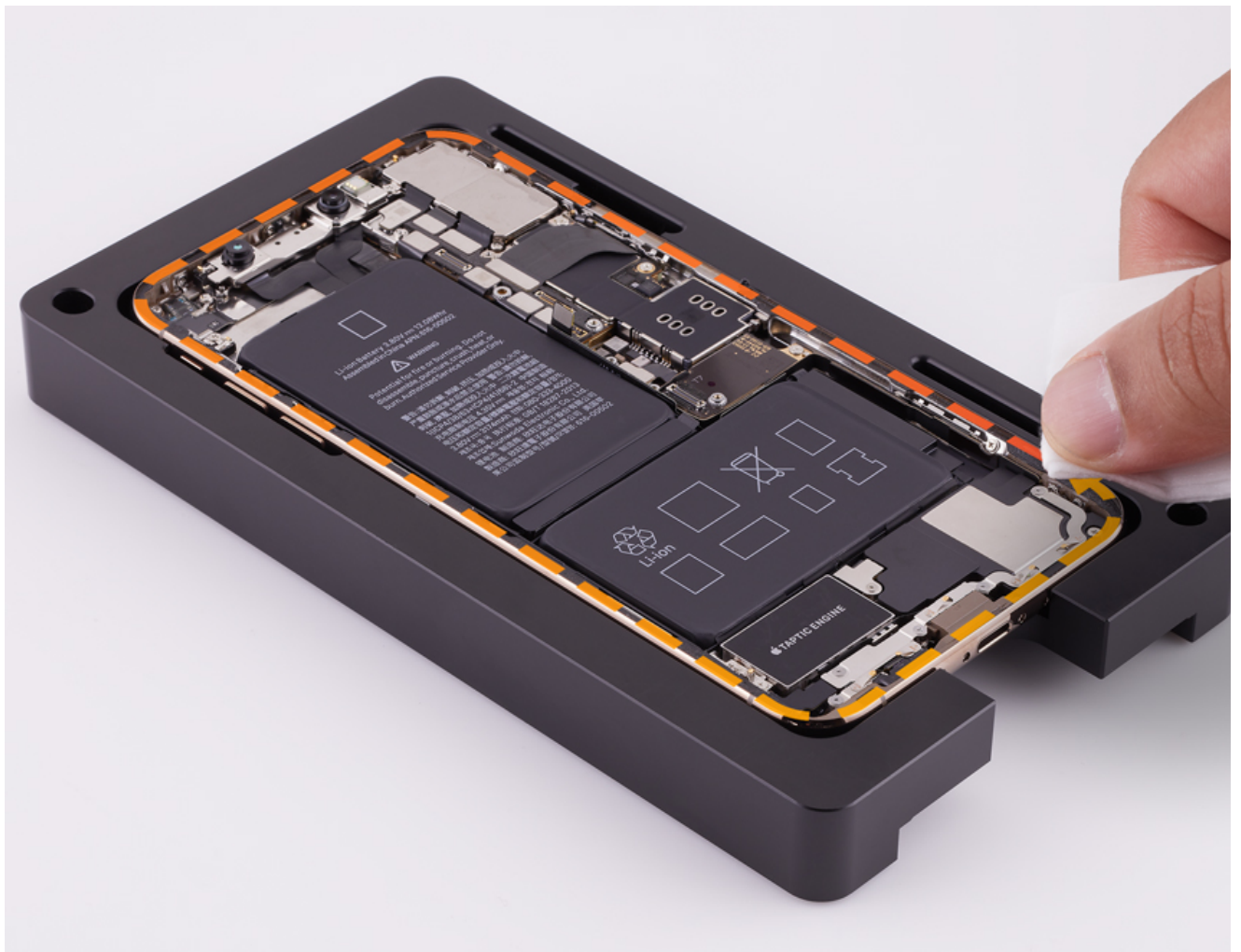




Use IPA wipes to clean any adhesive residue from the enclosure.

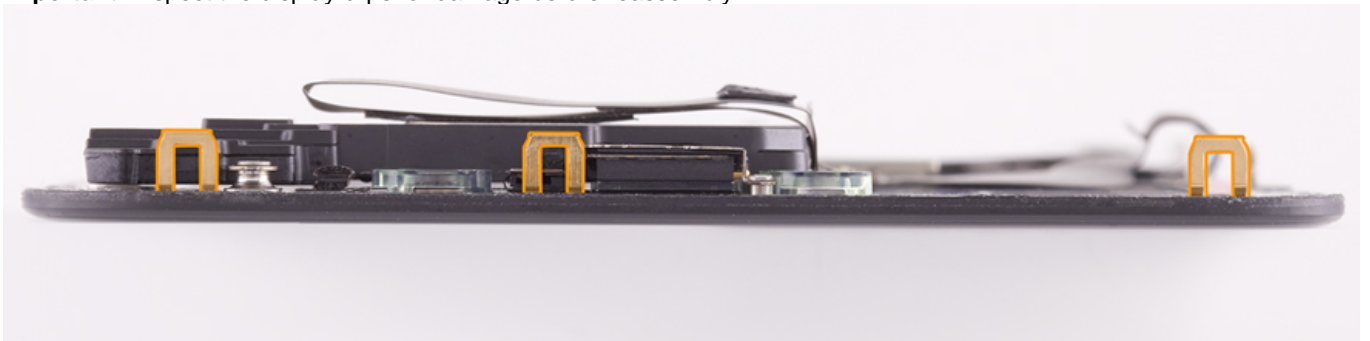
**Caution:** Do not use IPA wipes on the display, they may damage the display and affect image quality.

**Important:** Avoid touching the TrueDepth cameras and nearby components and the grounding pins near the bottom of the device.



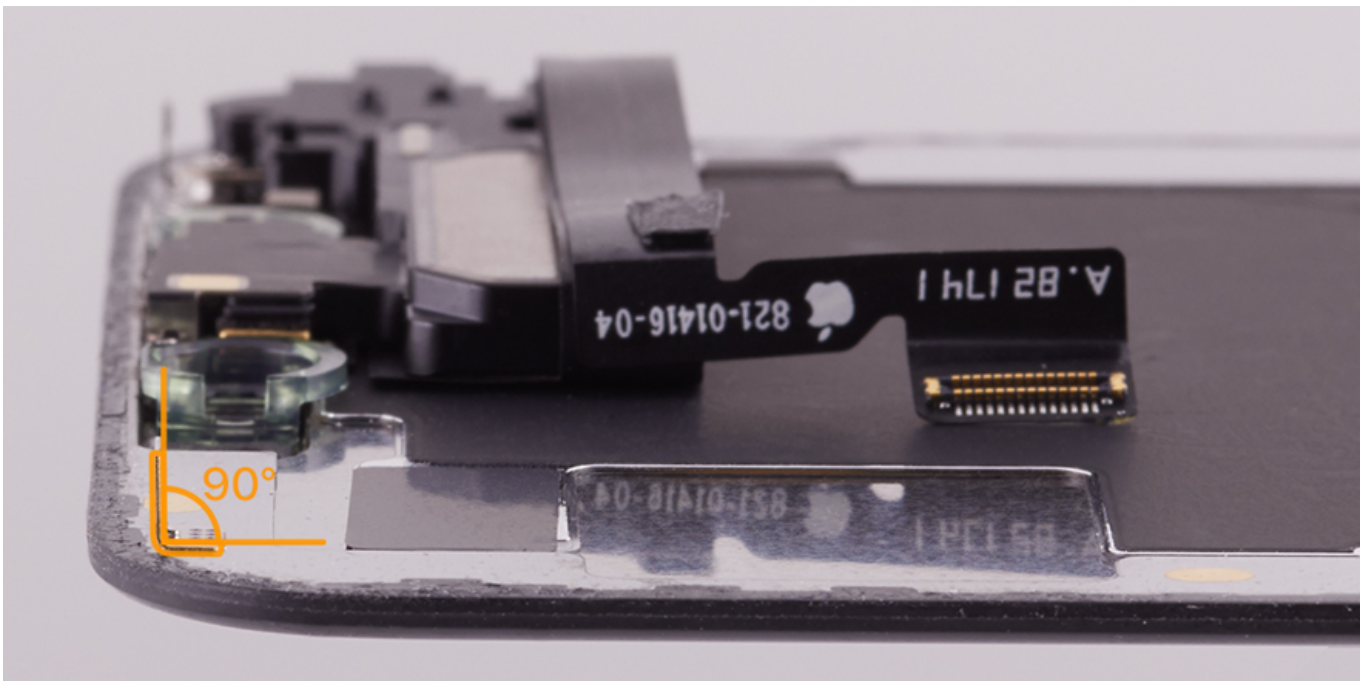
## Steps For Reassembly

**Important:** Inspect the display clips for damage before reassembly.

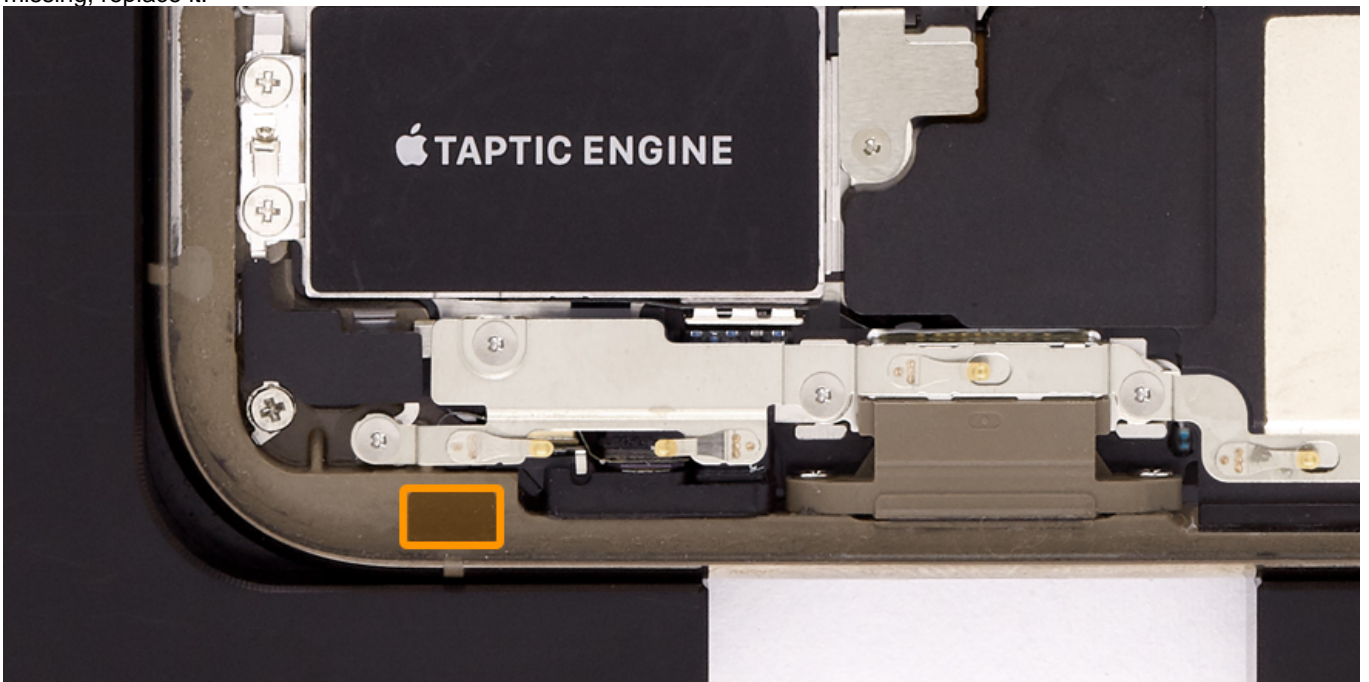


Verify that the clips are not bent or damaged.





Verify that the antenna band sticker is not damaged or missing. If the antenna band sticker (923-02955) is damaged or missing, replace it.



**Important:** Make sure that all adhesive is removed from the display and enclosure before applying new adhesive.

1. Align the display adhesive (923-02659) with the enclosure. **Important:** The flexible release liner must face the enclosure.

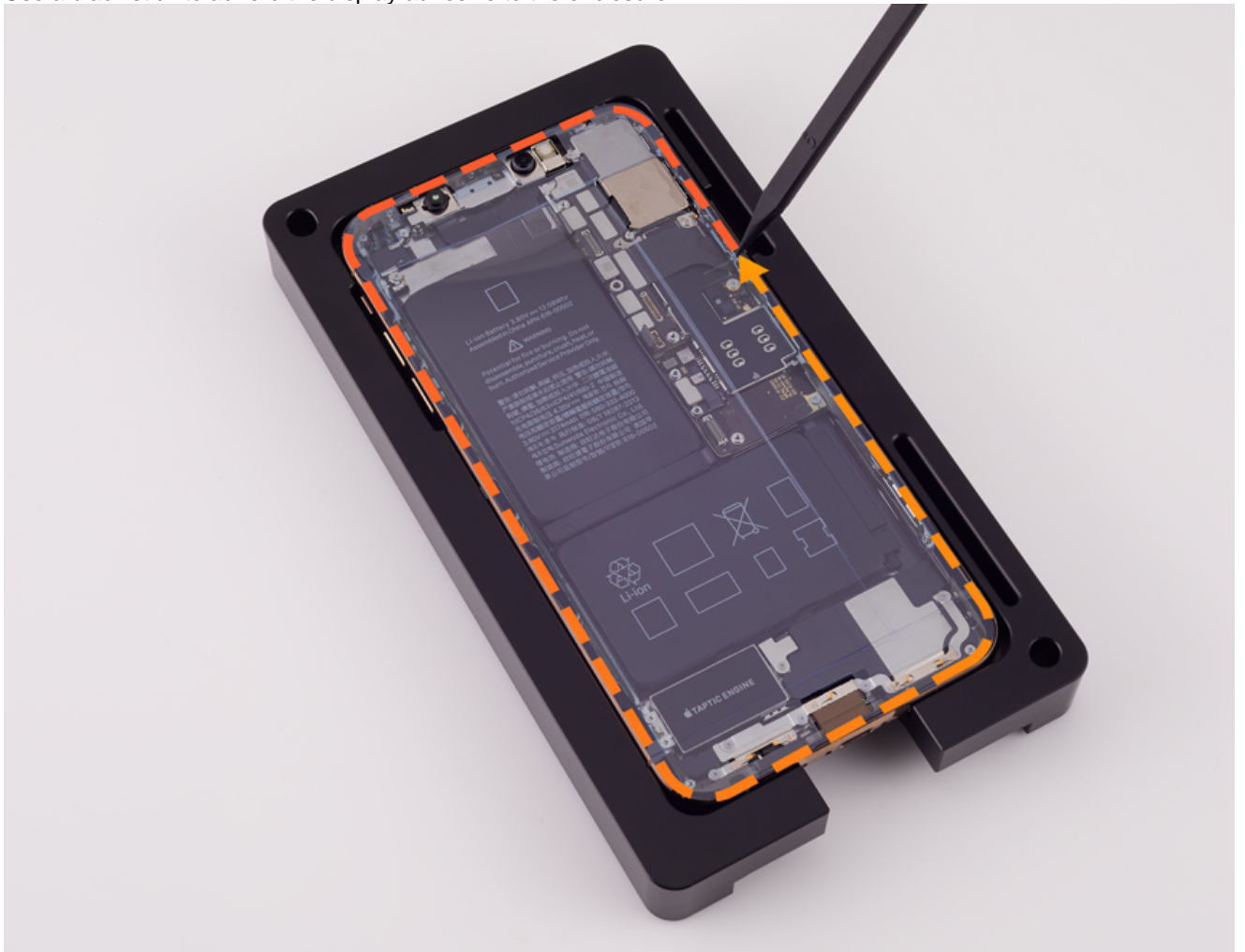


2. Slowly remove the flexible release liner while pressing the adhesive into the enclosure. **Important:** Do not remove the top release liners.



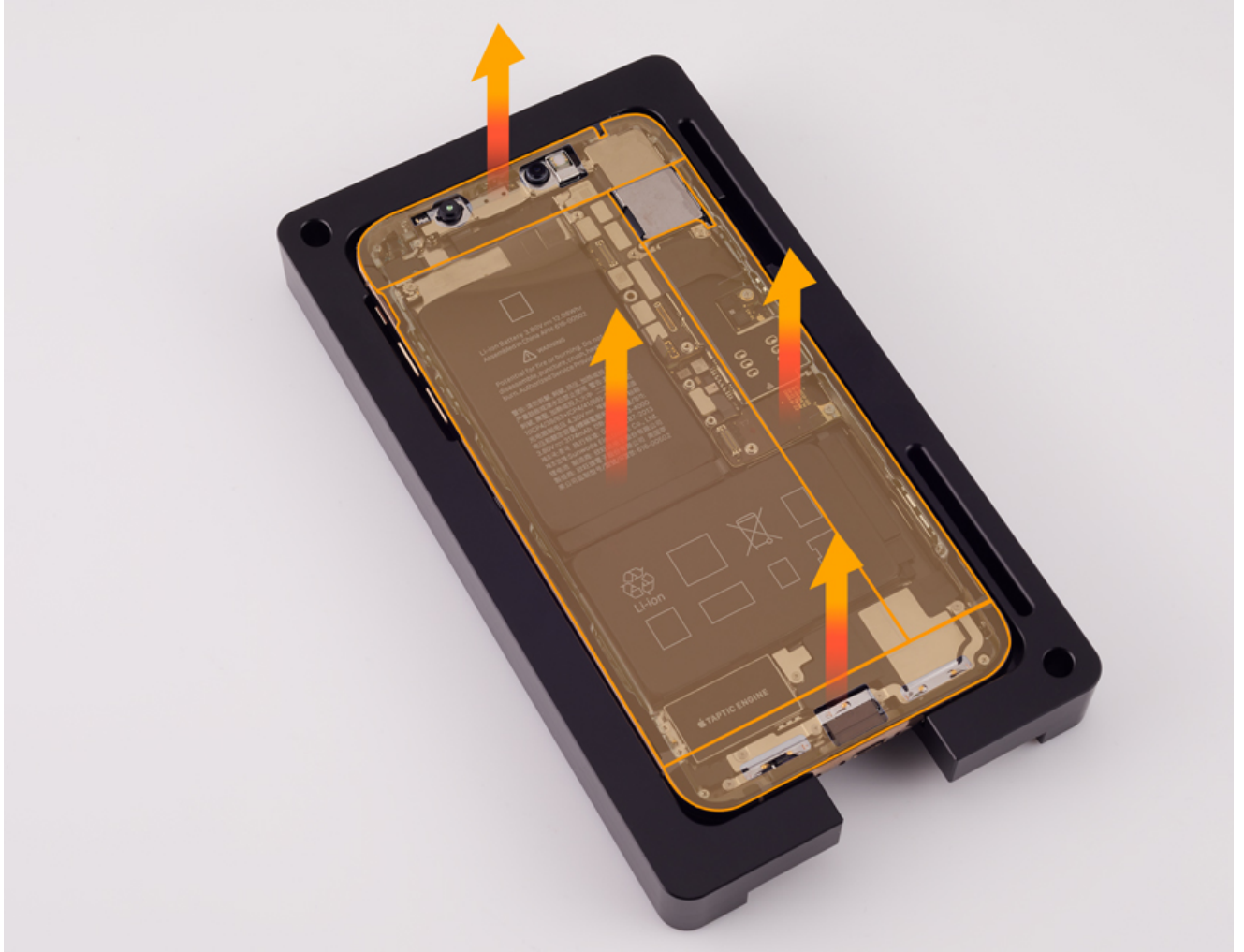


3. Use a black stick to adhere the display adhesive to the enclosure.

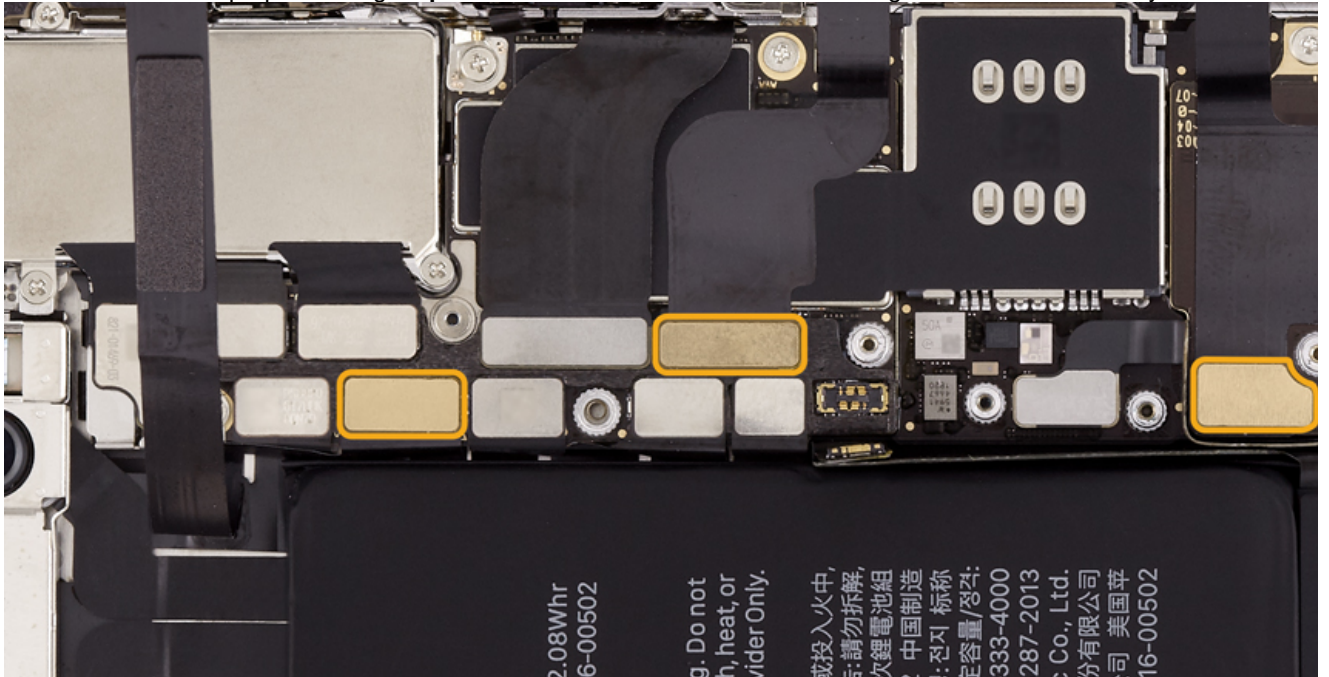




4. Remove the center section of the top release liner first, followed by the three sections running along the top, right, and bottom edges. **Important:** Do not remove the remaining release liners.



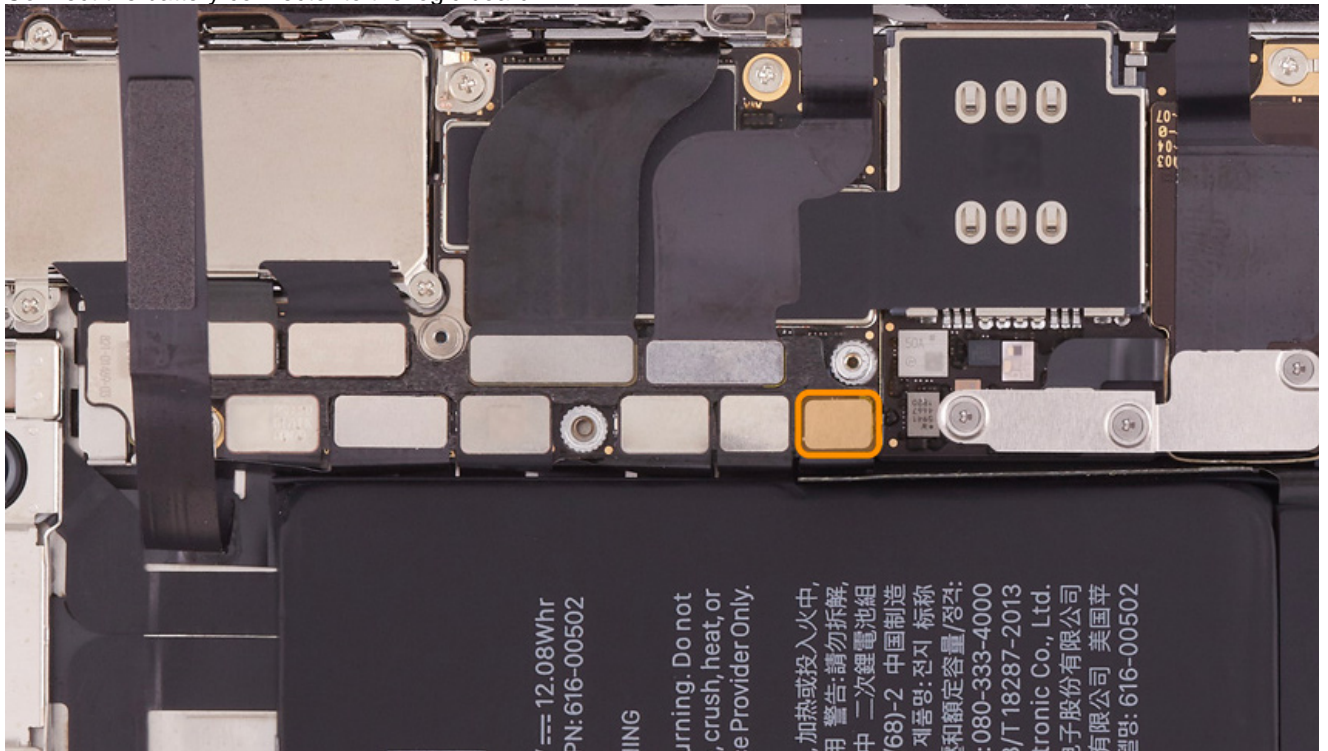
5. Connect three display connectors. Press down gently, applying even pressure along the entire length of each connector to ensure proper seating. **Important:** Route the left flex between the logic board and the battery.



6. Use the torque driver (black) and MicroStix bit to install three trilobe screws into the middle cowling (923-02690).
- 923-02692, left and center
  - 923-02694, right

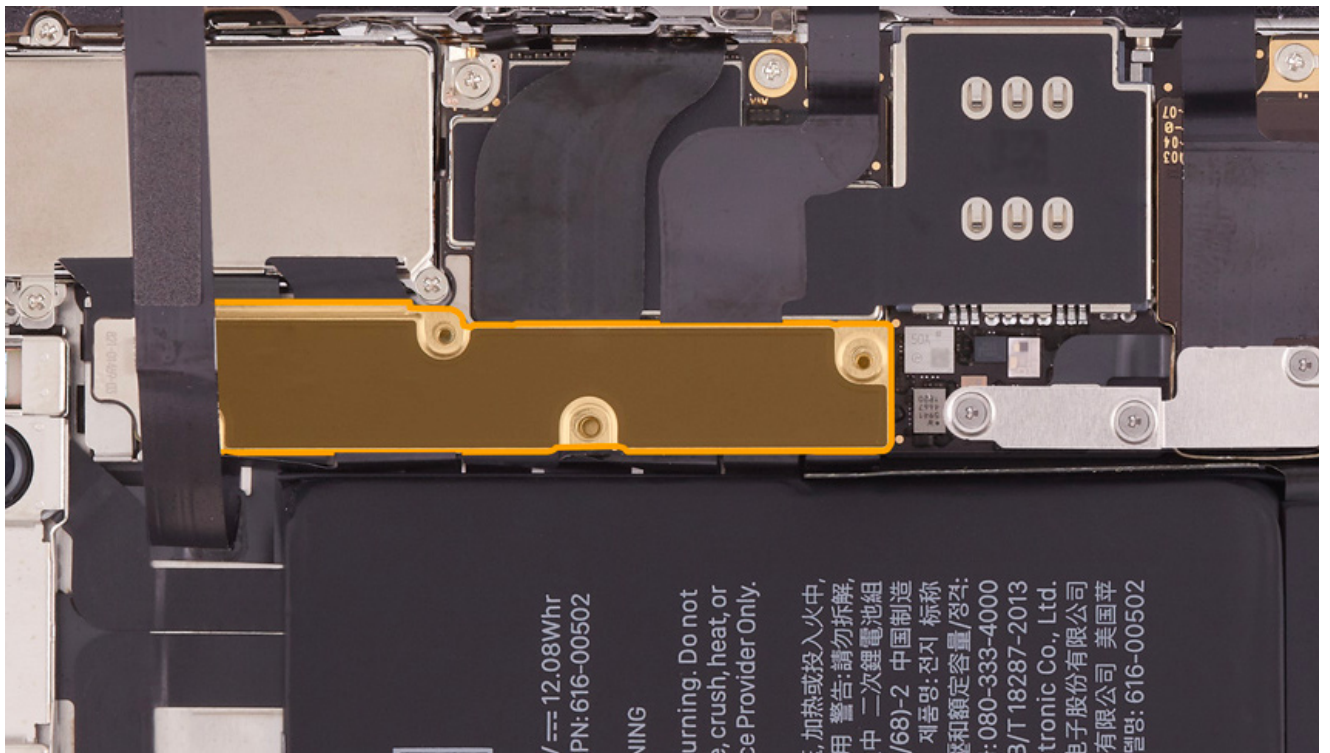


7. Connect the battery connector to the logic board.



8. Position the upper cowling (923-02691) over the connectors. **Important:** Make sure the left flex is routed correctly and is not blocking the screw boss.



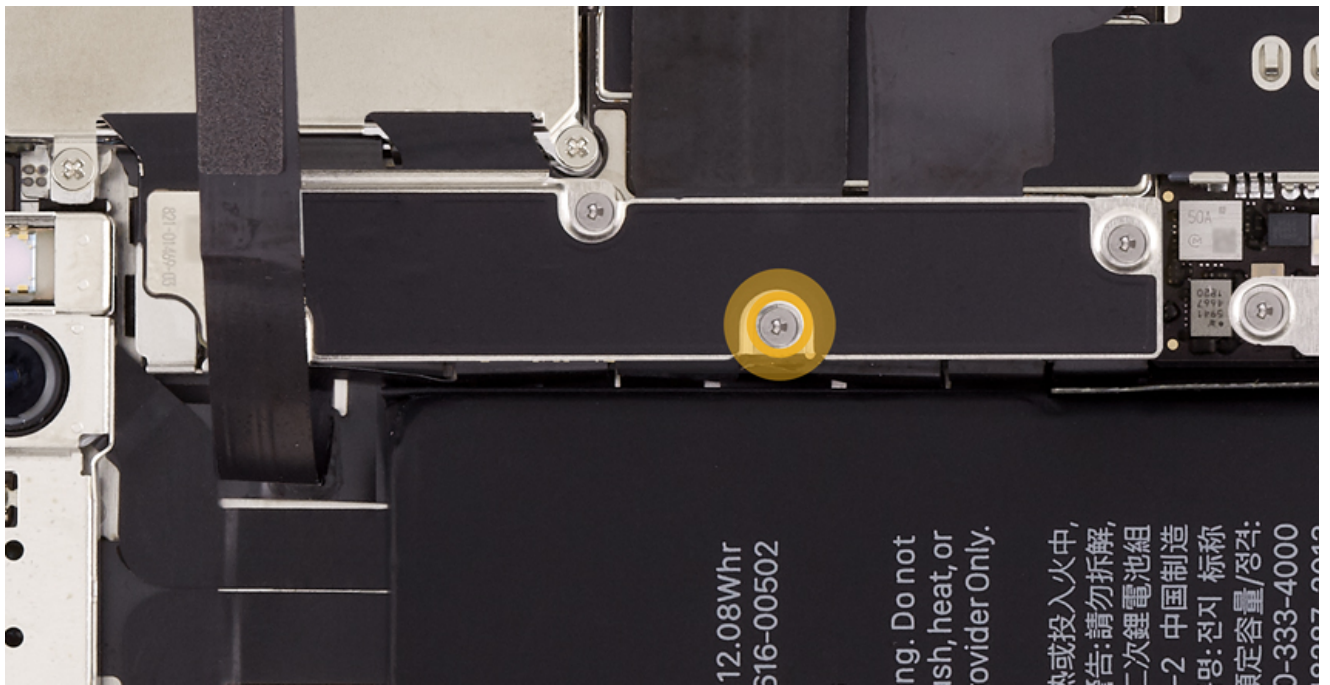


9. Use the torque driver (black) and MicroStix bit to install three new trilobe screws into the upper cowling.

- 923-02693, left
- 923-02694, top left, top right



10. Use the torque driver (green) and MicroStix bit to install one new trilobe screw (923-02695) into the upper cowling.



11. Peel the release liner in a counterclockwise direction starting near the top left corner of the enclosure. **Important:** Avoid touching the TrueDepth cameras and components.



12. Peel the release liner in a clockwise direction starting near the display flexes.





13. Peel the release liner in a counterclockwise direction starting near the bottom of the camera. **Important:** Avoid touching the TrueDepth cameras and components.



14. Inspect the display adhesive to make sure it is in the correct position and not damaged or wrinkled. If the adhesive is damaged, remove the adhesive and reapply.
15. Release the suction cups from the display. Tip the display to the left.



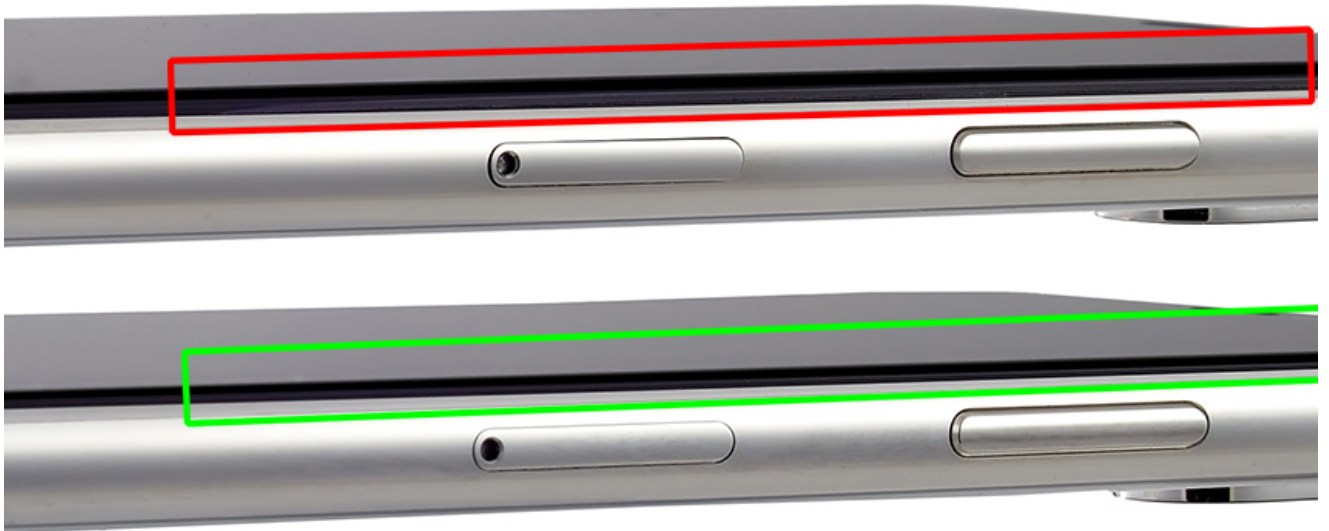
**Warning:** If the battery is dented, punctured, swollen, or otherwise damaged, then stop the repair. Do not remove the battery from the device. Reassemble the device and replace the whole unit. Refer to [TP328: iPhone Safety](#) and [HT204762: Enclosure separation due to expanded battery](#).



16. Press all corners of the display simultaneously, then press along the edges of the display until you hear a click and the display is flush with the enclosure.



**Important:** Ensure the display flexes are not trapped between the display and enclosure. Check the edges of the device to make sure they are not raised. Feel the edge of the display for variations. If the display is not flush, then remove the display, check the flexes for damage, and repeat reassembly steps.



17. Place the iPhone in the Display Press and pull the lever down until the press locks.

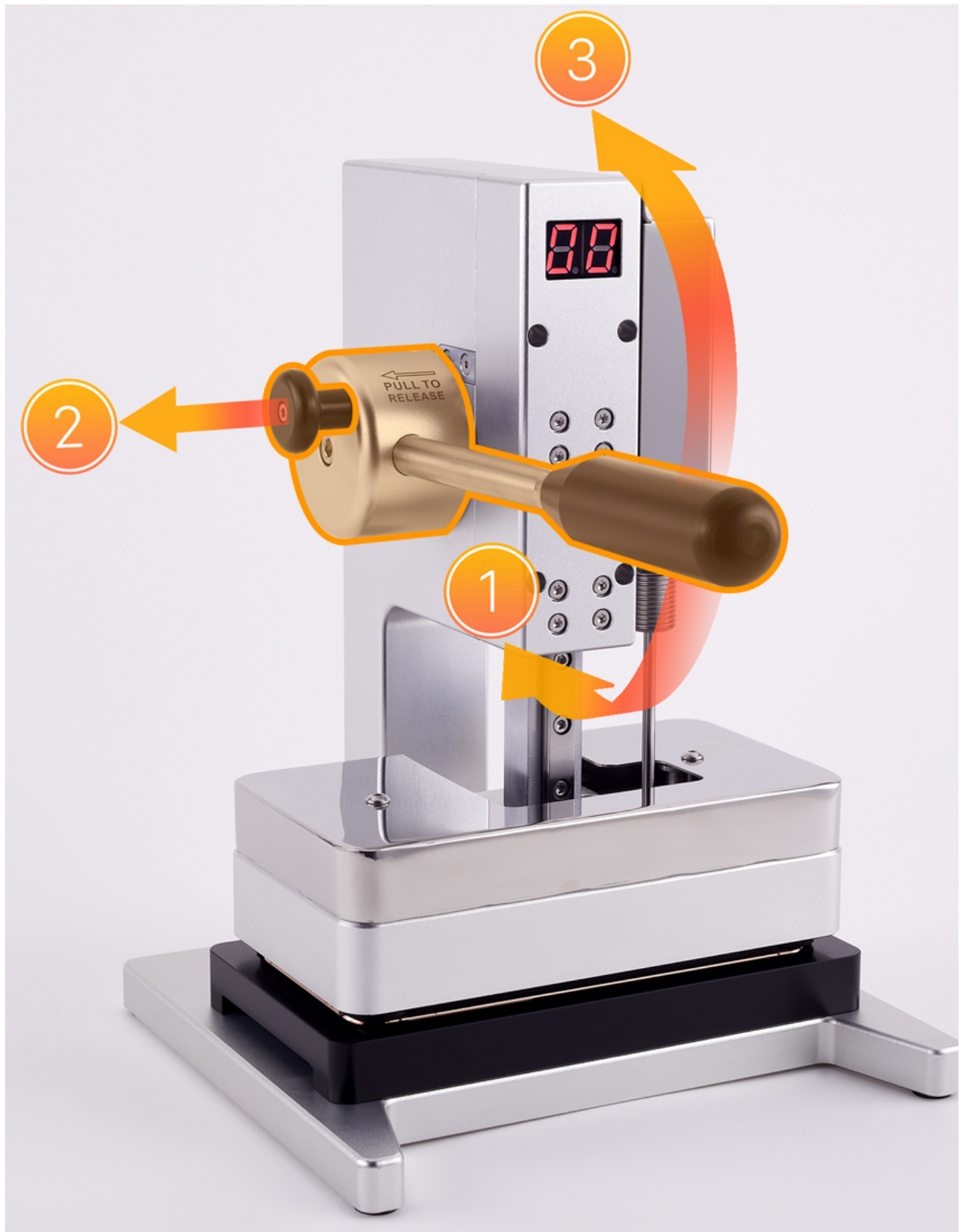
**Important:** Use the Display Press to ensure a proper seal and 3D Touch functionality. Display calibration may fail if you do not complete this step.





18. Wait until the press timer beeps, then hold the lever down slightly, pull the release knob, and lift the lever up.

**Important:** Use the Display Press to ensure a proper seal and 3D Touch functionality. Display calibration may fail if you do not complete this step.



19. Remove the iPhone from the press.

20. Use the torque driver (gray) and security bit to install two new security screws, one on each side of the Lightning connector. If the screws do not sit flush, then remove and discard the screws, repeat steps 17 and 18, and replace with new screws. If the new screws still do not sit flush, then remove and reinstall the display.

- 923-02833 (space gray)
- 923-02834 (silver)
- 923-02673 (gold)



21. **Important:** Check iPhone operation using the steps in [TP1045: Functional Test](#).

# iPhone Xs Max Replace Display Assembly

## First Steps

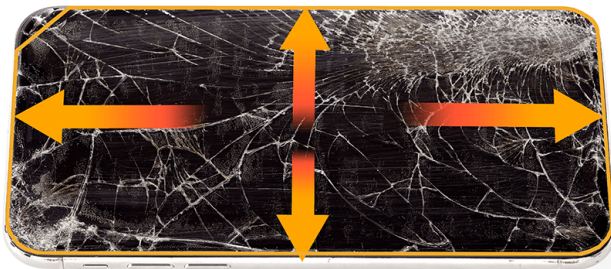
- Only Apple-certified technicians should perform this procedure.
- Refer to the [Visual/Mechanical Inspection \(VMI\) Guide](#) to determine whether any accidental damage is present.
- Remove all cases and screen protectors.
- Follow electrostatic discharge (ESD) precautions.
- Turn off the device.



**Warning:** If the enclosure is separated due to a swollen battery, stop the repair. Do not remove the battery from the device. Replace the whole unit. Refer to [TP328: iPhone Safety](#) and [HT204762: Enclosure separation due to expanded battery](#).

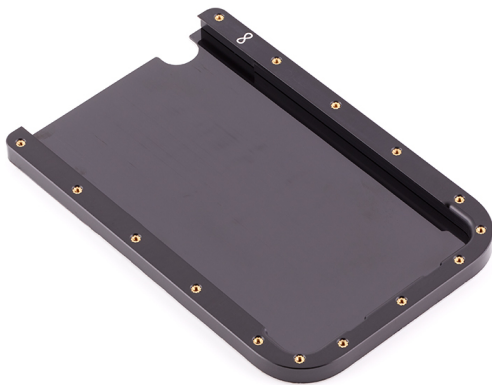
**Warning:** If the display glass is broken, put on safety glasses and material handling gloves. Use a vacuum cleaner to remove all glass shards from the workspace and display. Affix a protective display cover or packing tape to the display before removal to prevent injury or scattering of glass. Do not install the protective display cover or tape over the edge of the display.

When installing a 6.5-inch Display Protective Cover (923-02758), firmly press the cover onto the broken display to remove air bubbles and work the adhesive into the cracks in the glass. Let the cover settle into place for up to 12 minutes for more damaged displays before attempting to remove the display. The longer the protective display cover is left on the display, the stronger the bond between the cover and the broken glass.



If the back glass is broken, adhere a 6.5-inch Back Protective Cover (923-02668) before attempting a repair. If the back protective cover does not adhere to the iPhone or if there is no glass for the film to adhere to, do not attempt a repair. Devices without back glass and devices that the back protective cover cannot adhere to will require a whole unit replacement.

Then place the iPhone in the 6.5-inch support frame (923-02665) before attempting to open the device. If the device does not fit into the support frame, do not attempt a repair. Devices that do not fit into the support frame will require a whole unit replacement.



## Important:

- Display calibration software requires a publicly released version of iOS. For iPhones running beta or SDK versions of iOS, perform a DFU restore before attempting display replacement and calibration.
- Check for iPhone bezel damage that would prevent proper display assembly seating. If the damage is present, replace the whole unit.





## Tools

- Bar code scanner

## Steps For Removal

1. Perform the [Open Device](#) procedure.

## Steps For Reassembly

1. Remove all packaging from replacement display.
2. Use a replacement display and follow the reassembly steps in [RP1443: Open Device](#).
3. Place a speaker port cover (923-02296) over the speaker port prior to calibration. The speaker port cover reduces the noise generated by the phone during calibration. Calibration without a speaker port cover will not affect the results.



4. **Important:** Display calibration is required after a display assembly replacement.
5. **For Retail:** Use the bar code scanner to scan the static known bad board serial number or type "OLDSERIALNUMBER" in English when prompted. **Note:** The serial number field is not case sensitive.



**For AASPs:** Refer to the “Adding Display Parts to GSX” section of [OP1796: Creating a Carry-In Repair for iPhone display repairs](#).

6. If calibration fails, perform the following steps:

If the calibration fails again, then reseal the cables and attempt calibration again in the last used fixture.

If resealing does not resolve the issue, replace the whole unit. Note the failure in the repair and process the part as DOA.

**Note for AASPs:** Refer to [OP1796: Creating a Carry-In Repair for iPhone display repairs](#) to resolve calibration failures.

- Follow software prompts
  - Reset the device
  - Reattempt display calibration. **Important:** Use an alternate fixture if available.
7. Remove and discard the speaker port cover.
  8. **Important:** Check iPhone operation using the AST 2 diagnostics suites recommended in [TP1570: Diagnostics Mode](#). If AST 2 is not available, follow the steps in [TP1045: Functional Test](#).

# iPhone Xs Max Camera

## First Steps

- Perform the [Open Device](#) procedure.

### Important:

- Only Apple-certified technicians should perform this procedure.
- Wear nitrile or lint-free gloves to prevent contamination of the camera lens.
- Avoid touching the TrueDepth cameras and nearby components.
- When entering the serial number for the repair transaction, use the serial number of the smaller camera closest to the top of the enclosure.

Refer to [SV382: iPhone Xs Max Camera Replacement Video](#) for video instruction.



## Tools

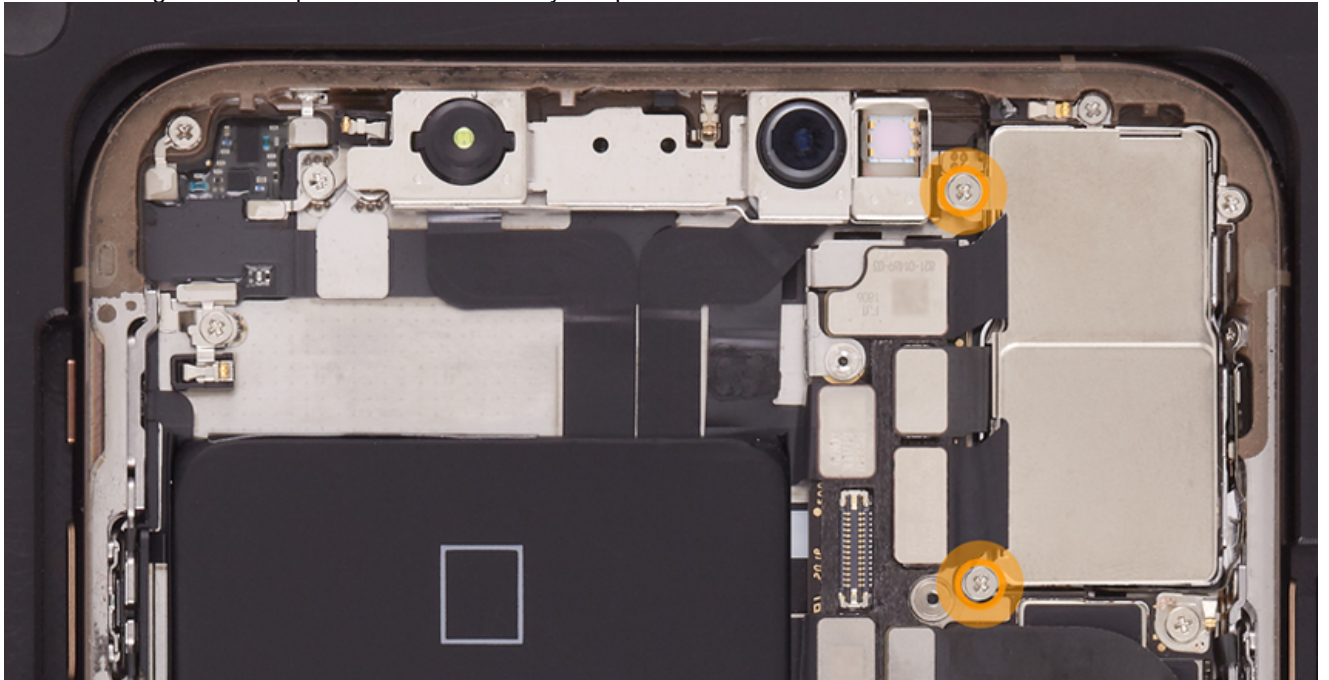
1. Torque driver (black) (923-0248)
2. JCIS bit for crosshead screws (923-0246)
3. ESD-safe tweezers
4. Black stick (922-5065)
5. Nitrile or lint-free gloves



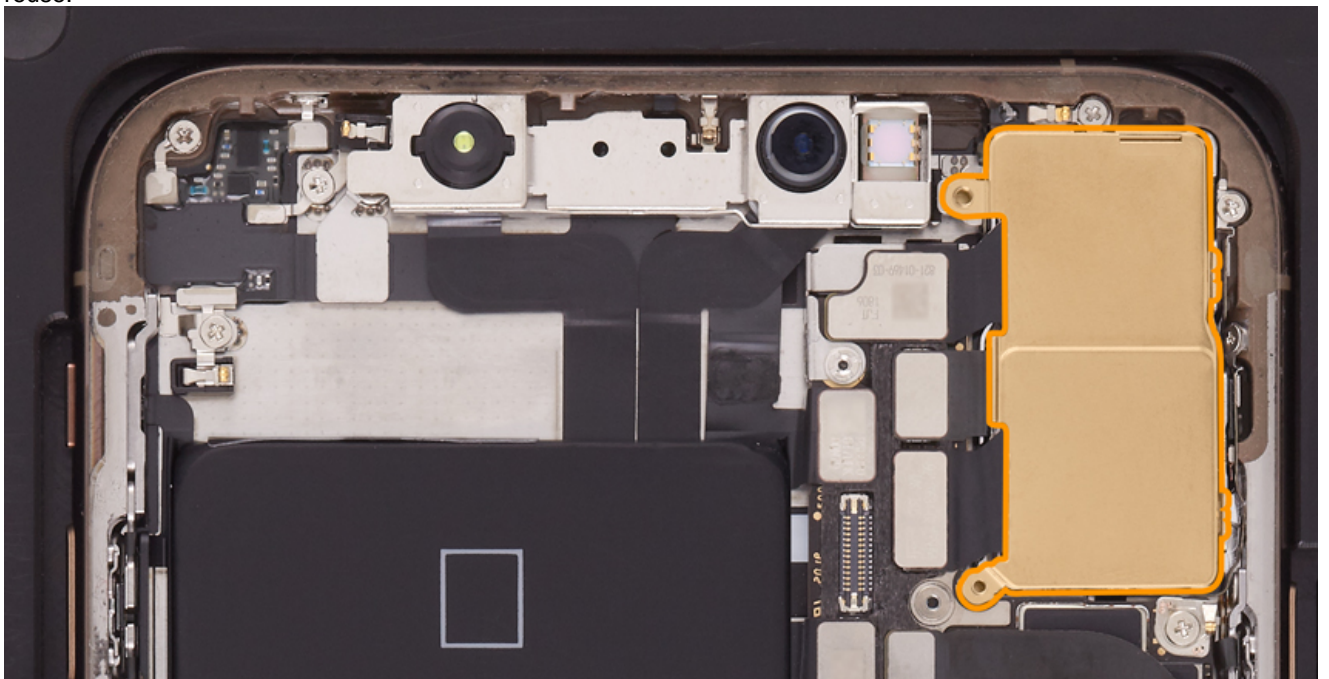


## Steps For Removal

1. Use the torque driver and JCIS bit to remove and discard two crosshead screws from the camera cowling. **Important:** Avoid touching the TrueDepth cameras and nearby components.



2. Lift the camera cowling from the left side and slide the tabs out of the enclosure slots. Save the camera cowling for reuse.



3. Disconnect the two camera flex connectors.





4. Remove the camera from the enclosure.



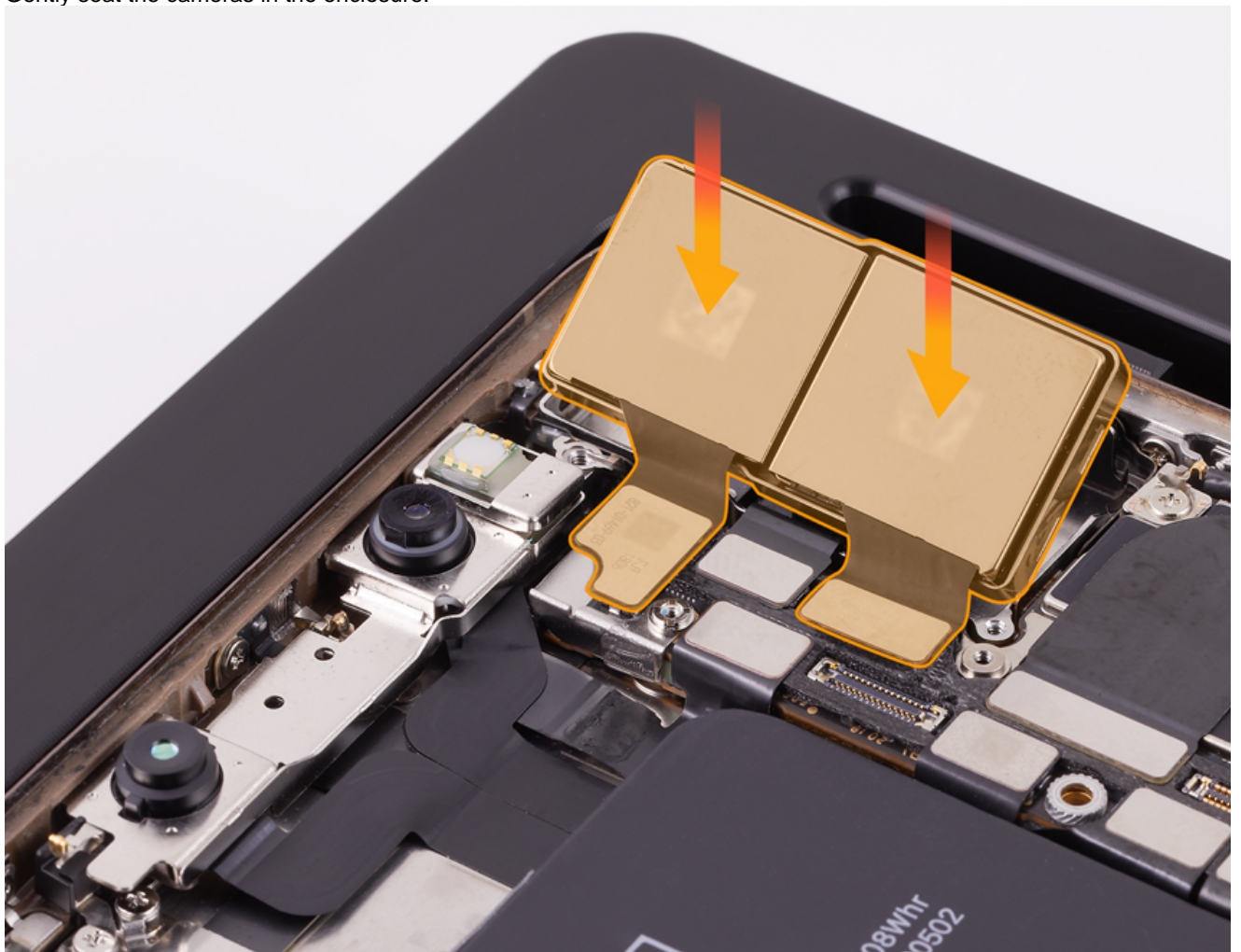
### Steps For Reassembly

1. Wearing nitrile gloves, remove the protective lens cover from the replacement cameras.
2. Position the cameras in the enclosure.
3. Connect the two camera flex connectors to the logic board.





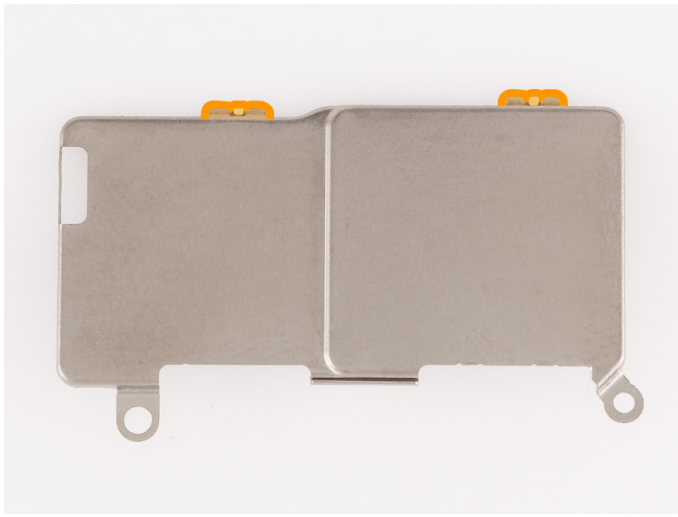
4. Gently seat the cameras in the enclosure.





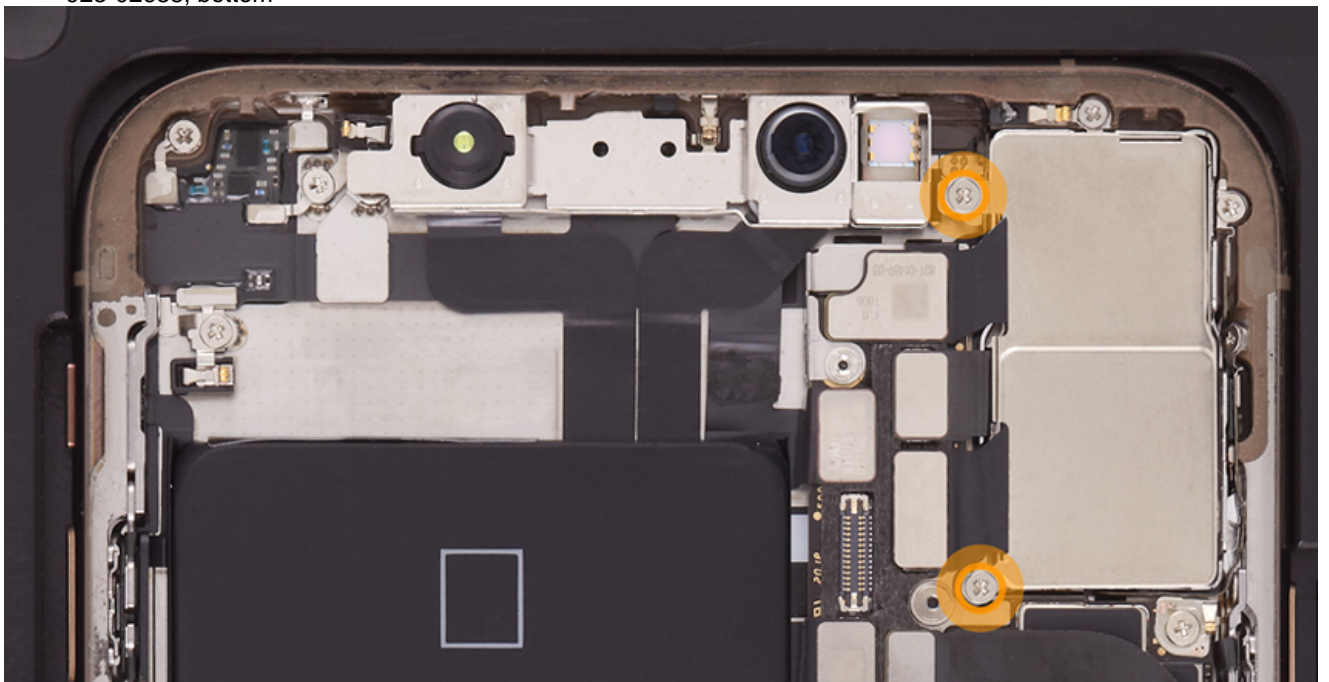
5. Place the camera cowling (923-02686) on the cameras. **Important:** Make sure the tabs on the cowling are seated in the slots in the enclosure.





6. Use the torque driver (black) and JCIS bit to install two new crosshead screws into the camera cowling.

- 923-02687, top
- 923-02688, bottom



7. Follow the reassembly steps in [RP1443: Open Device](#).

8. Run the AST 2 Camera Image Quality suite to evaluate the camera image quality after the repair.

9. **Important:** Check iPhone operation using the AST 2 diagnostics suites recommended in [TP1570: Diagnostics Mode](#). If AST 2 is not available, follow the steps in [TP1045: Functional Test](#).



# iPhone Xs Max Speaker

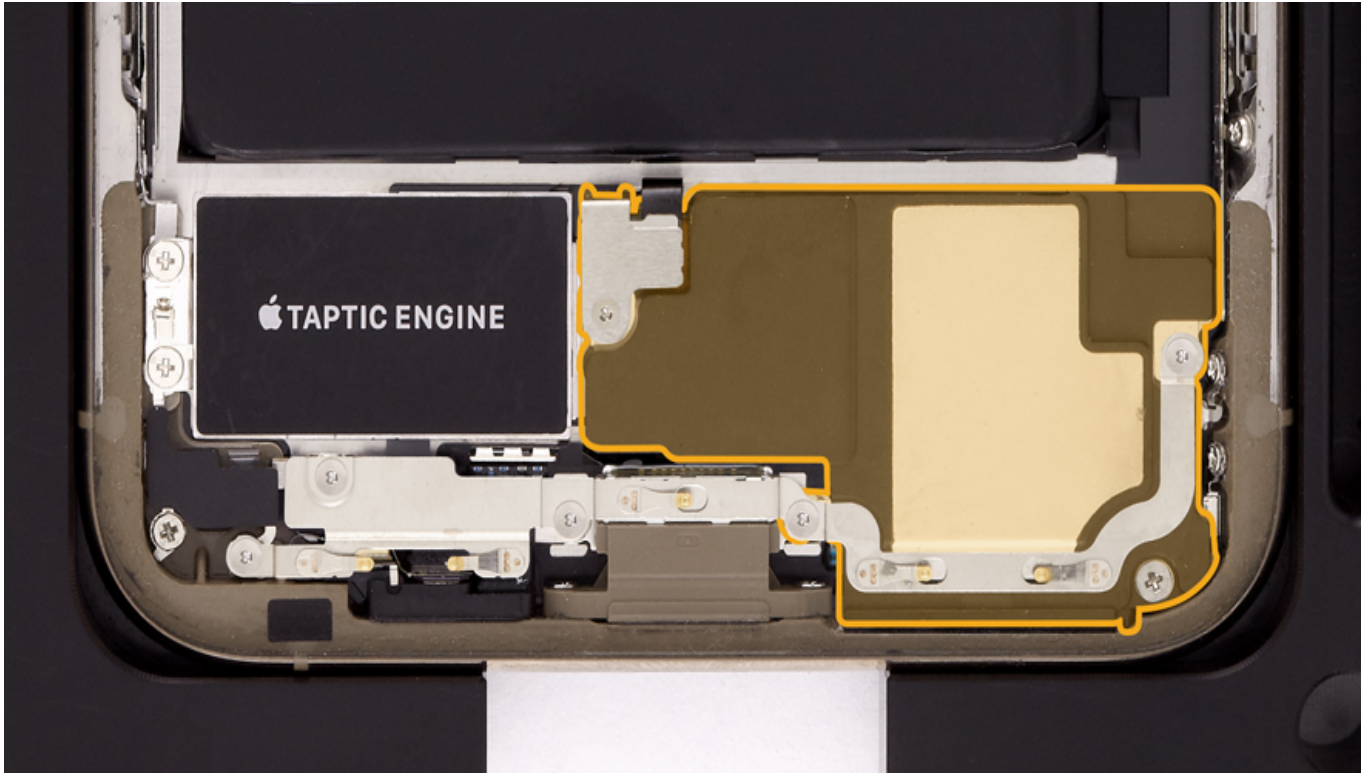
## First Steps

- Perform the [Open Device](#) procedure.

**Important:** Only Apple-certified technicians should perform this procedure.

If you remove the speaker (923-02649) from the enclosure, you must replace it with a new speaker.

Refer to [SV384: iPhone Xs Max Speaker Replacement Video](#) for video instruction.



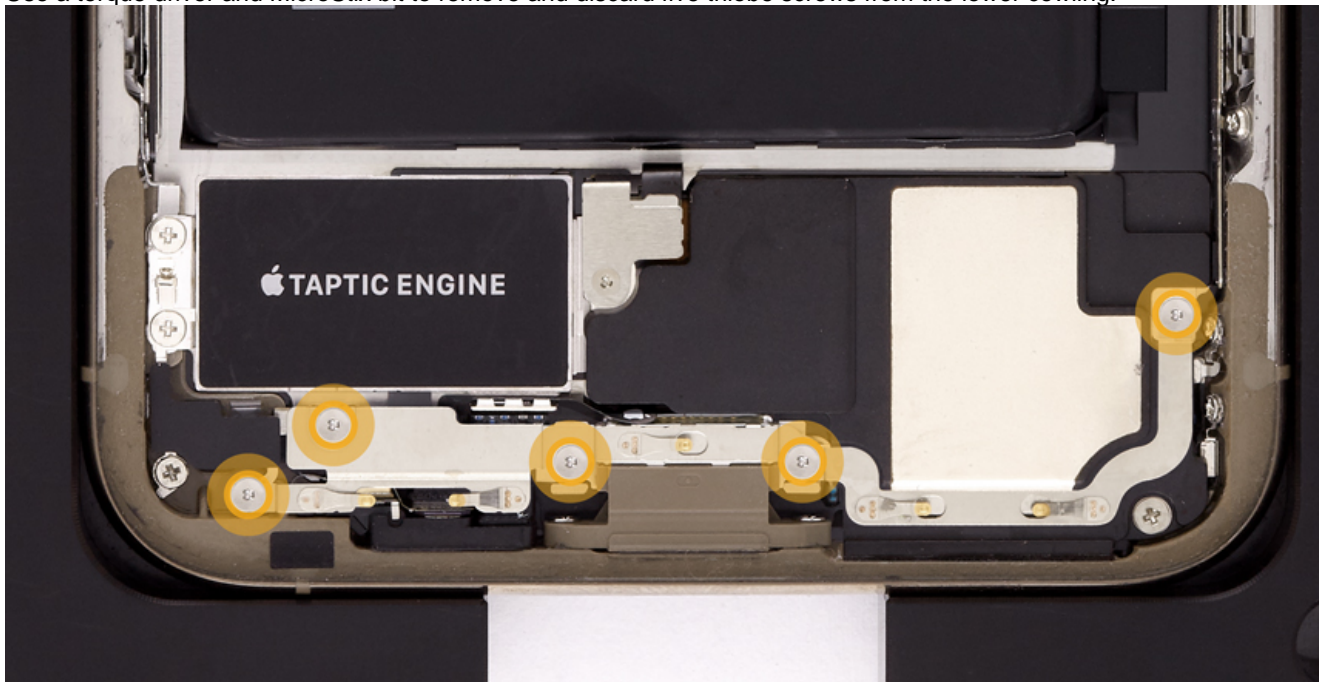
## Tools

1. Torque driver (black) (923-0248)
2. Torque driver (green) (923-00738)
3. Torque driver (gray) (923-00105)
4. JCIS bit for crosshead screws (923-0246)
5. MicroStix bit (923-01290)
6. Superscrew bit (923-02066)
7. ESD-safe tweezers
8. Black stick (922-5065)
9. IPA wipes



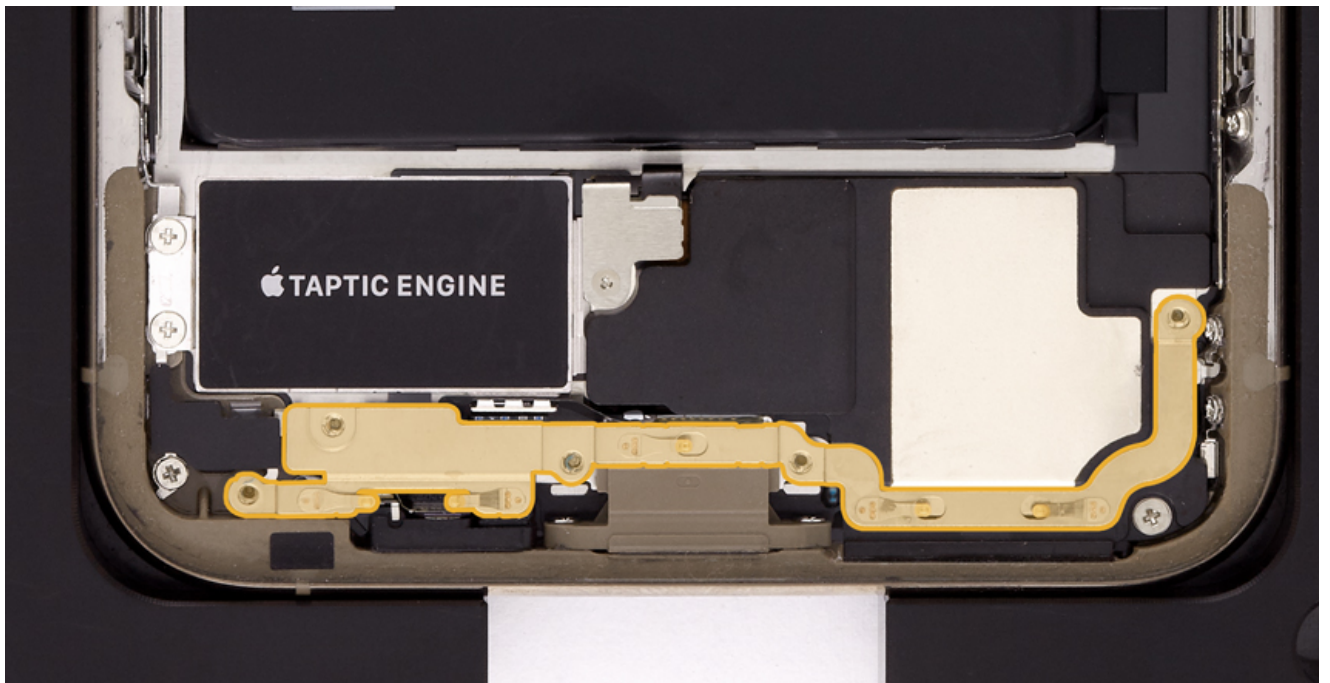
## Steps For Removal

1. Use a torque driver and MicroStix bit to remove and discard five trilobe screws from the lower cowl.

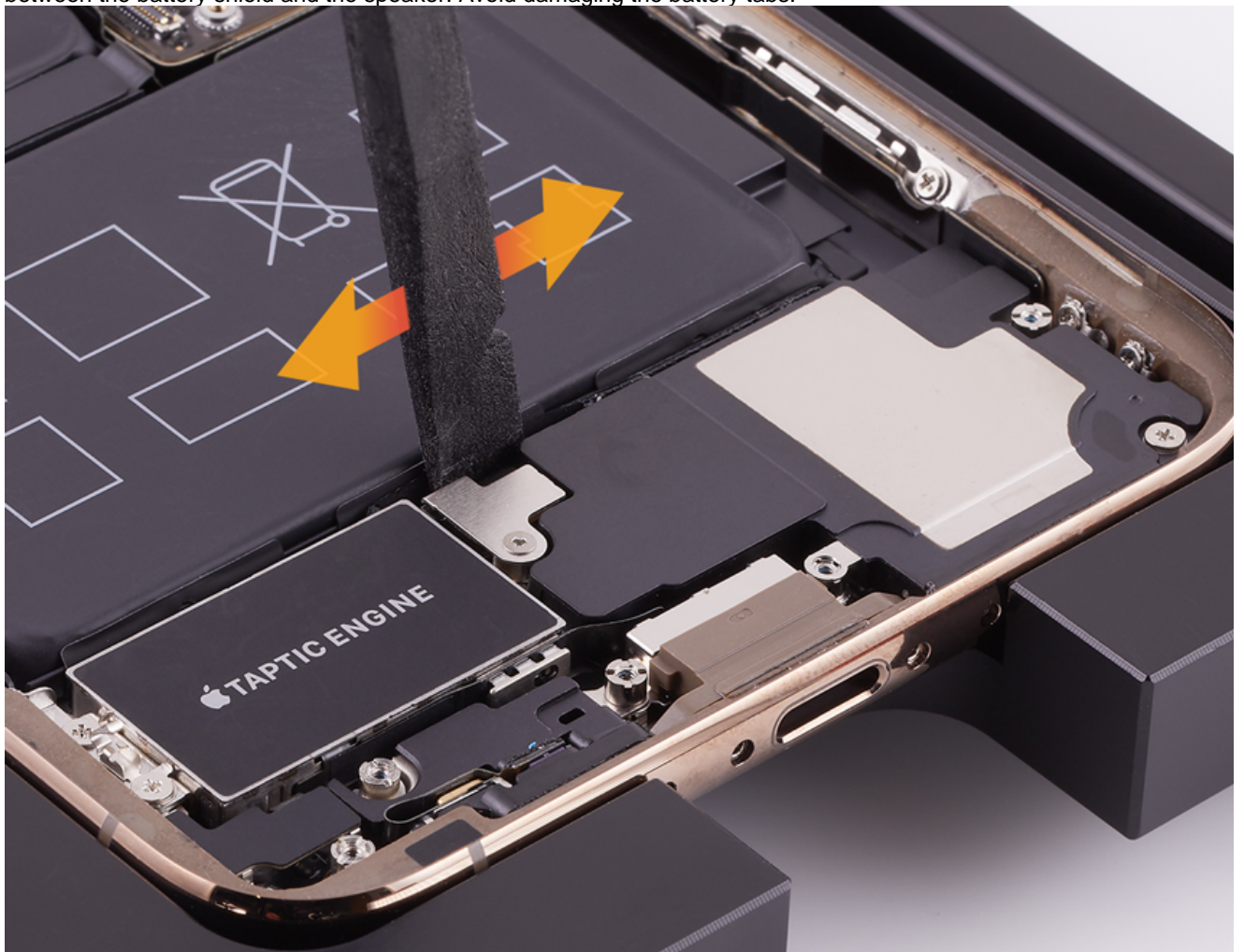


2. Gently remove the lower cowl from the speaker and save it for reuse.



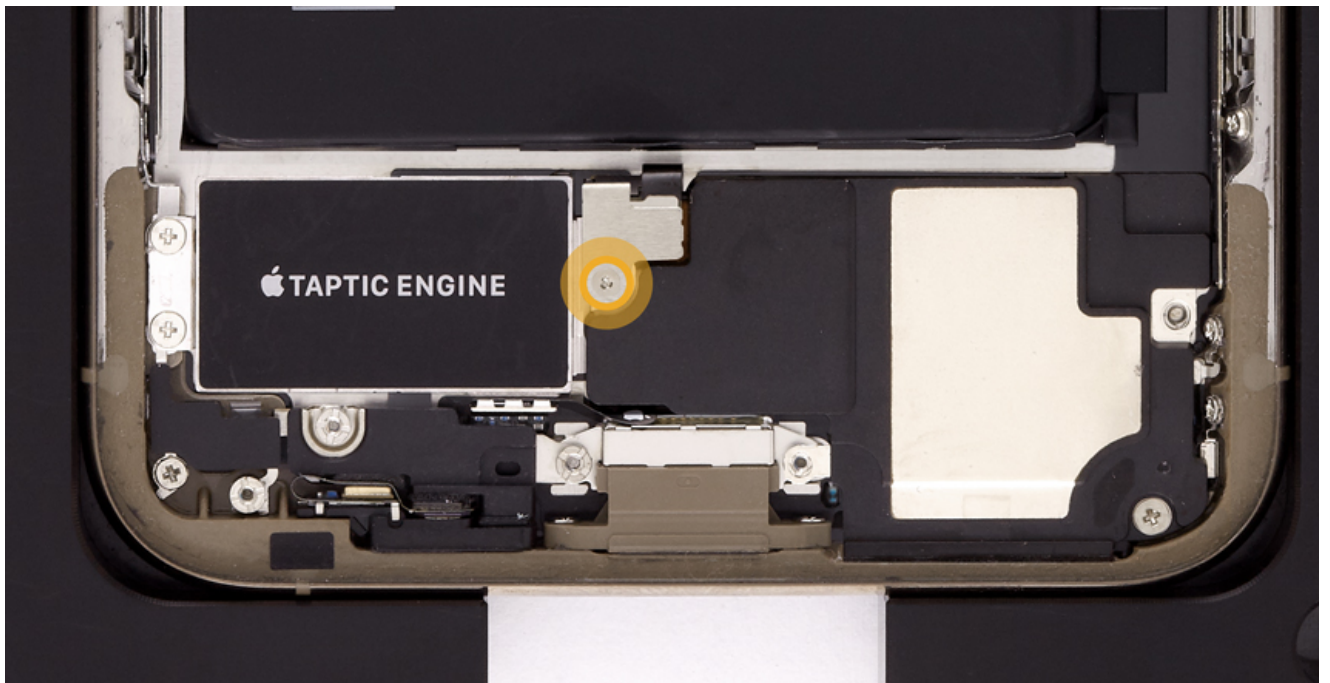


3. Use a black stick to separate and remove the battery shield from the speaker and Taptic Engine. Place the black stick between the battery shield and the speaker. Avoid damaging the battery tabs.

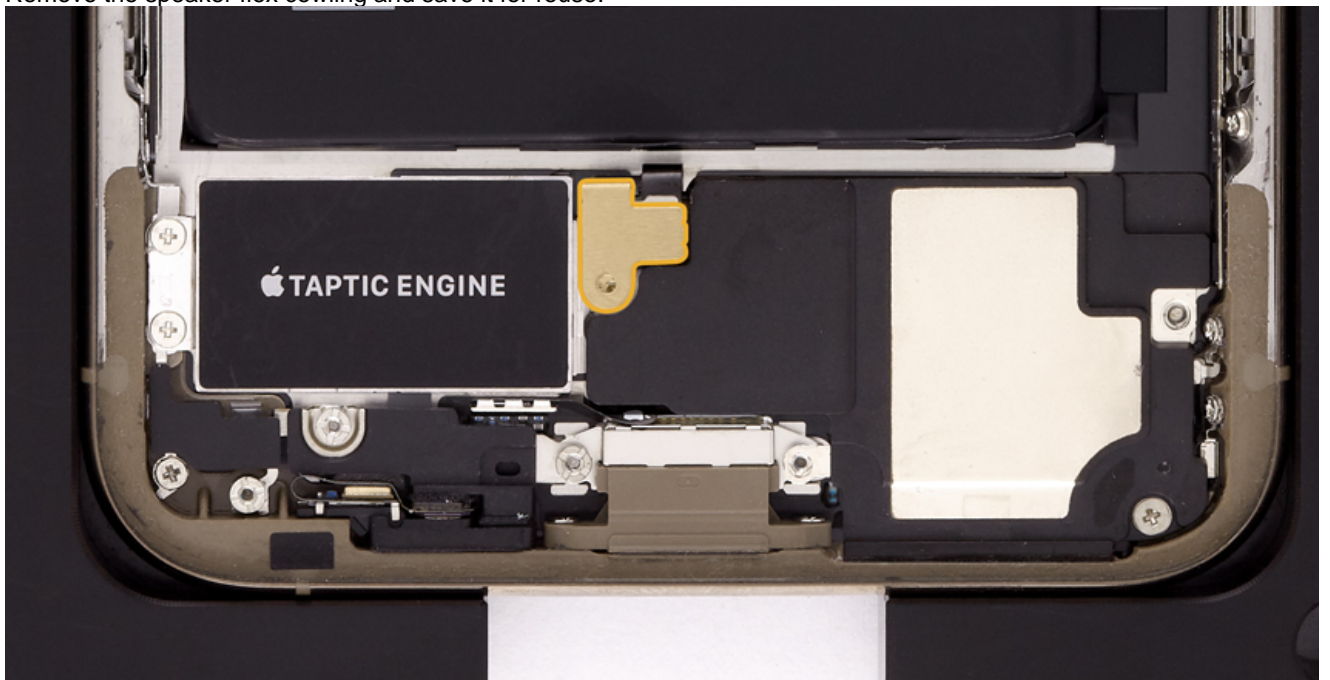


4. Use a torque driver and MicroStix bit to remove and discard one trilobe screw from the speaker flex cowling.

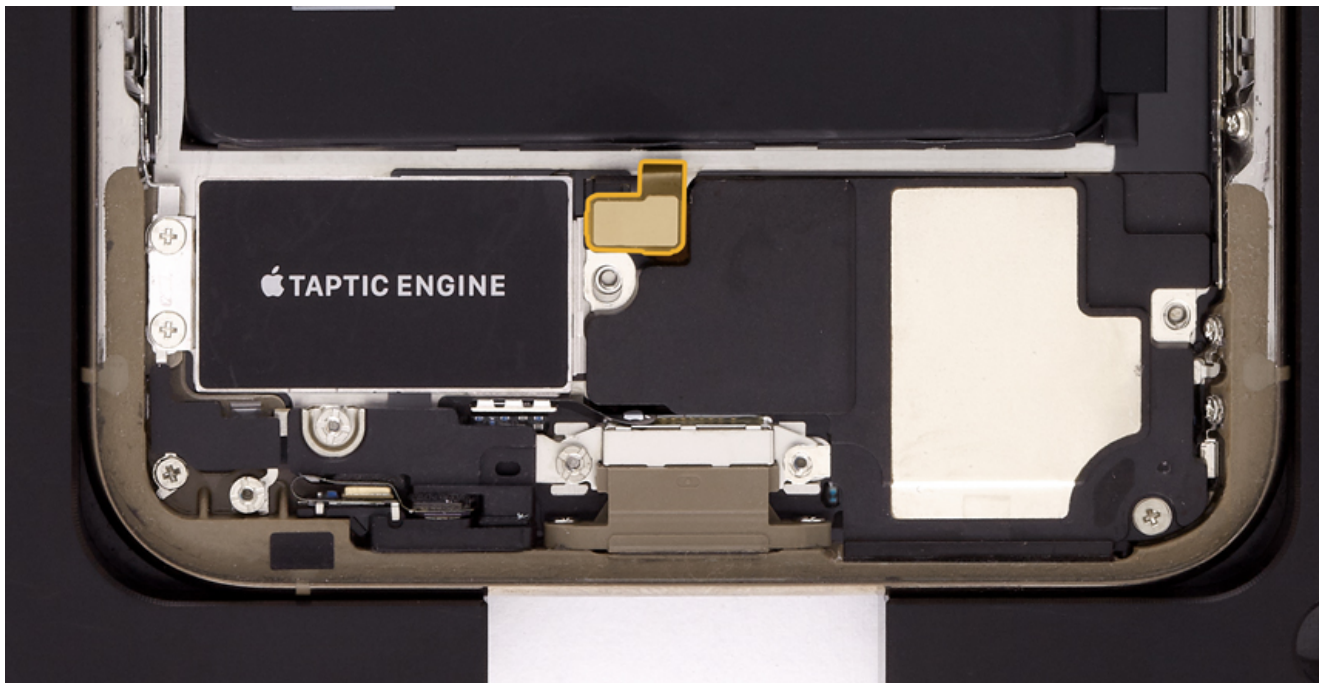




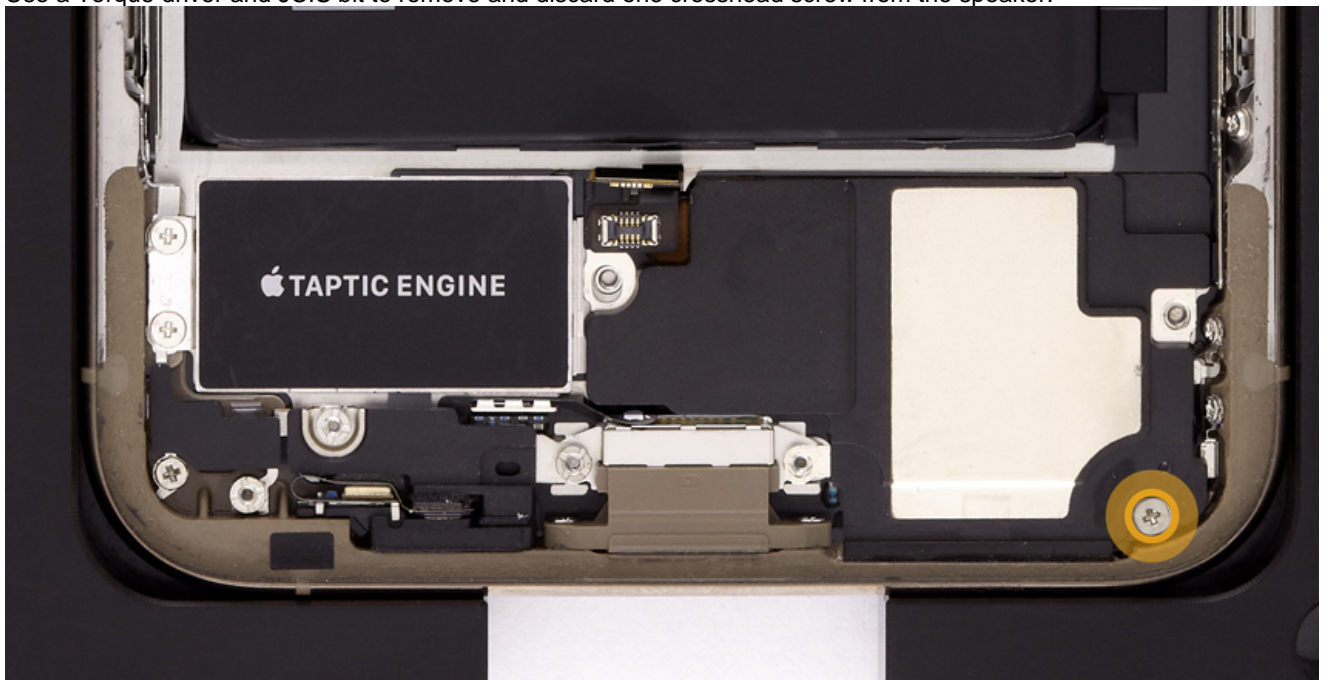
5. Remove the speaker flex cowl and save it for reuse.



6. Use a black stick to disconnect the speaker flex connector.

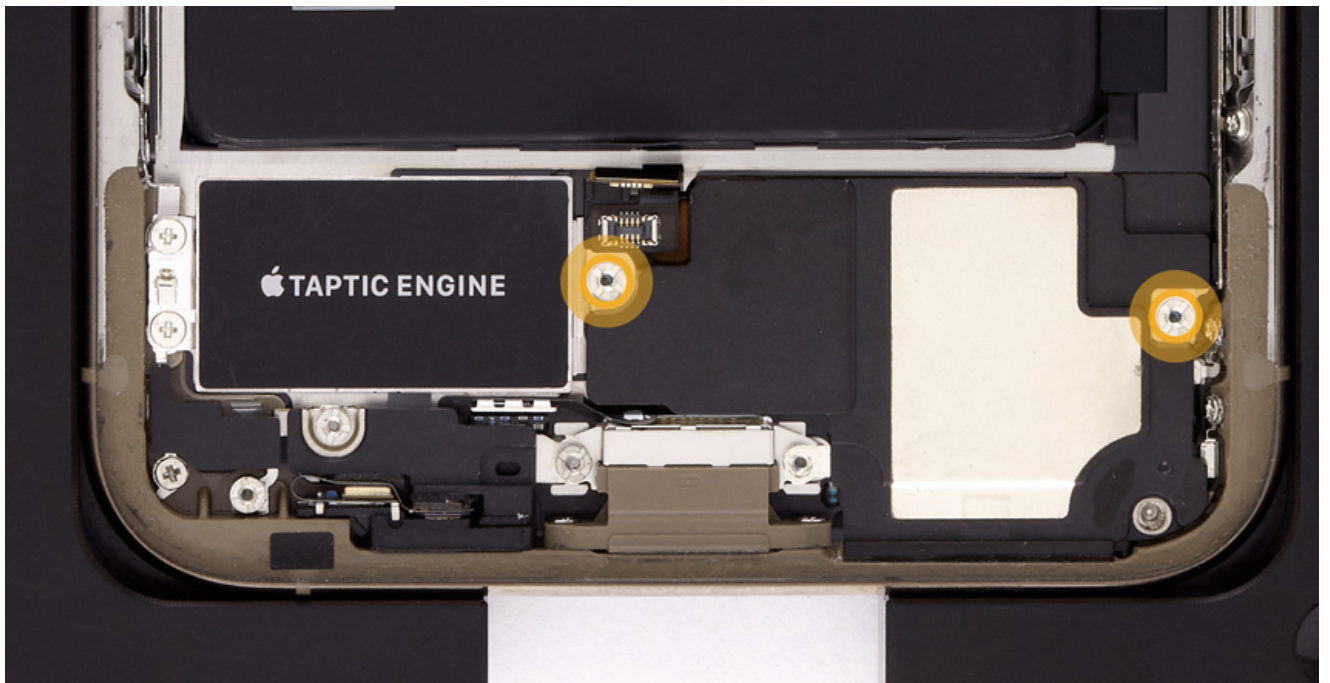


7. Use a Torque driver and JCIS bit to remove and discard one crosshead screw from the speaker.

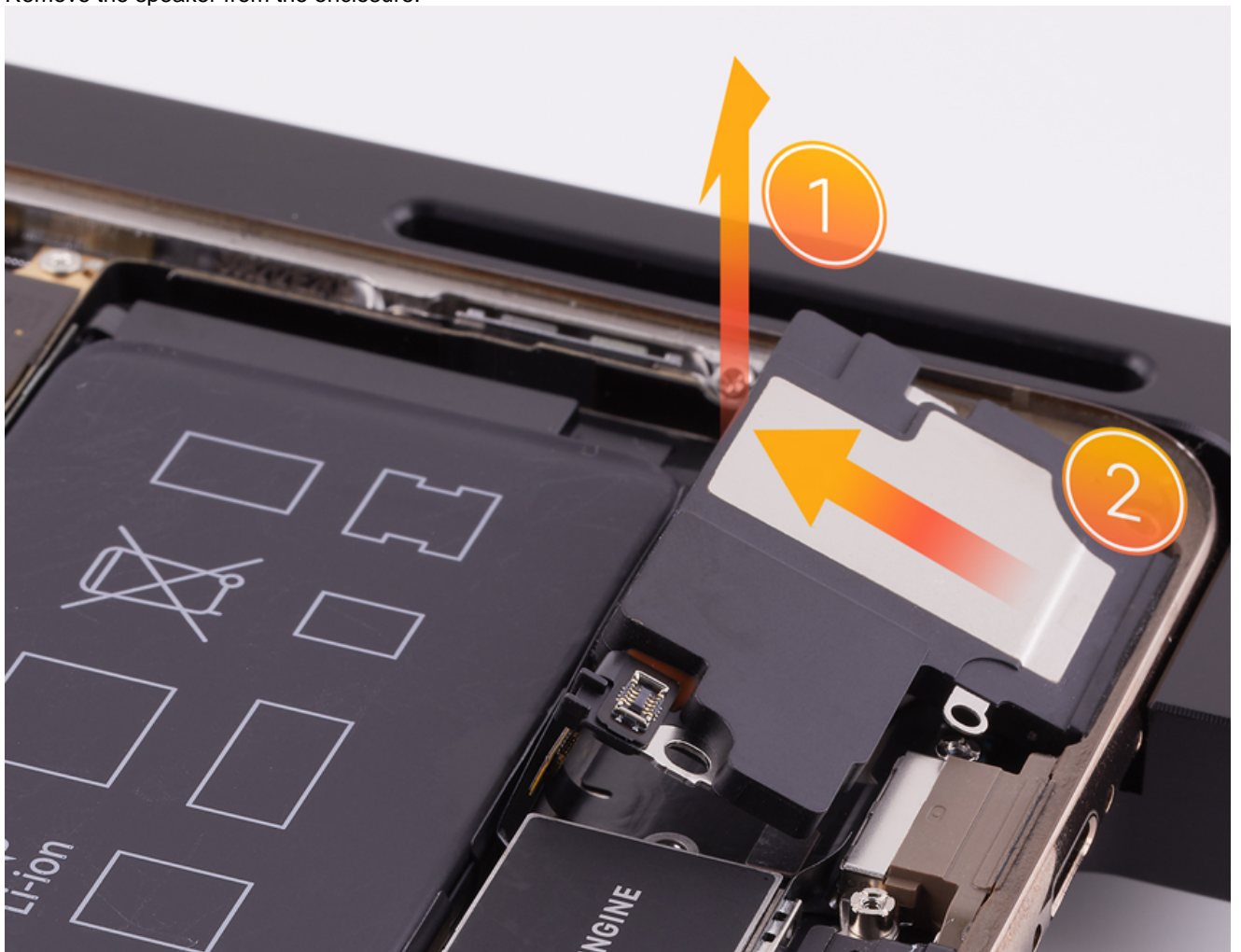


8. Use a torque driver and superscrew bit to remove and discard two superscrews from the speaker.

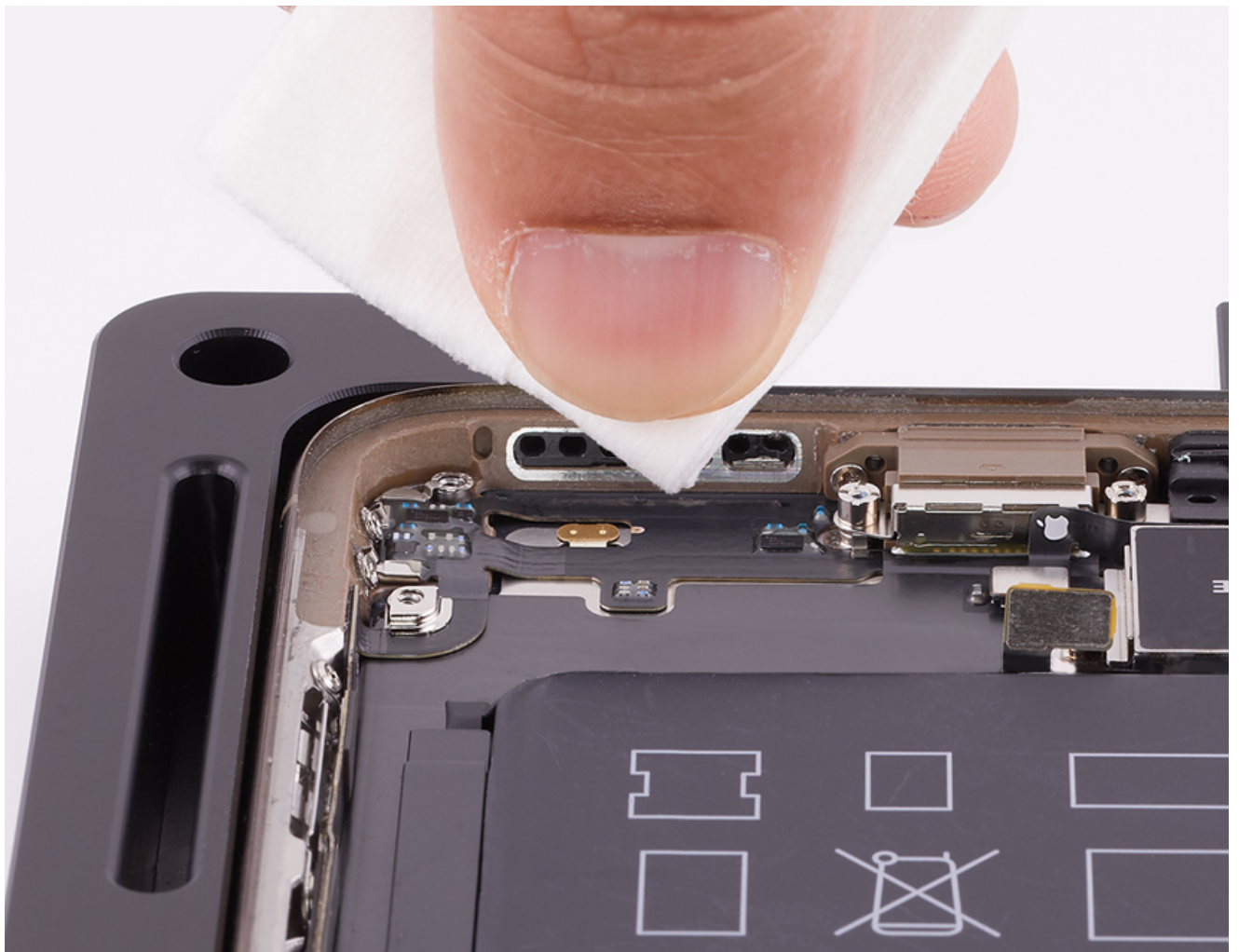




9. Remove the speaker from the enclosure.



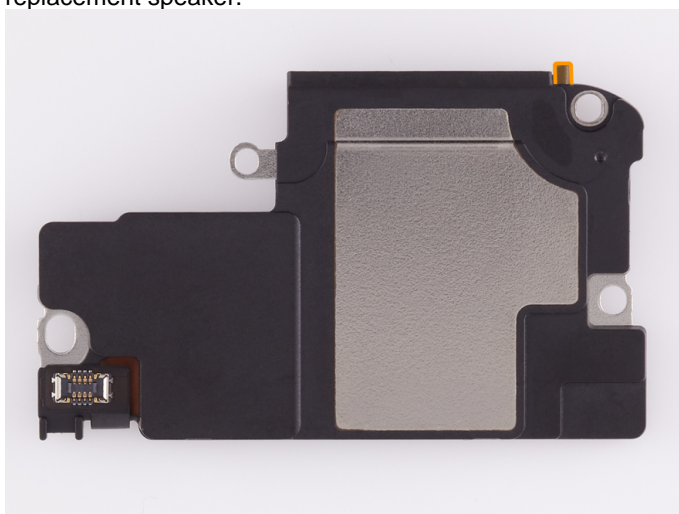
10. Use an IPA wipe to gently clean adhesive residue from the speaker port in the enclosure. Remove and discard the battery shield.

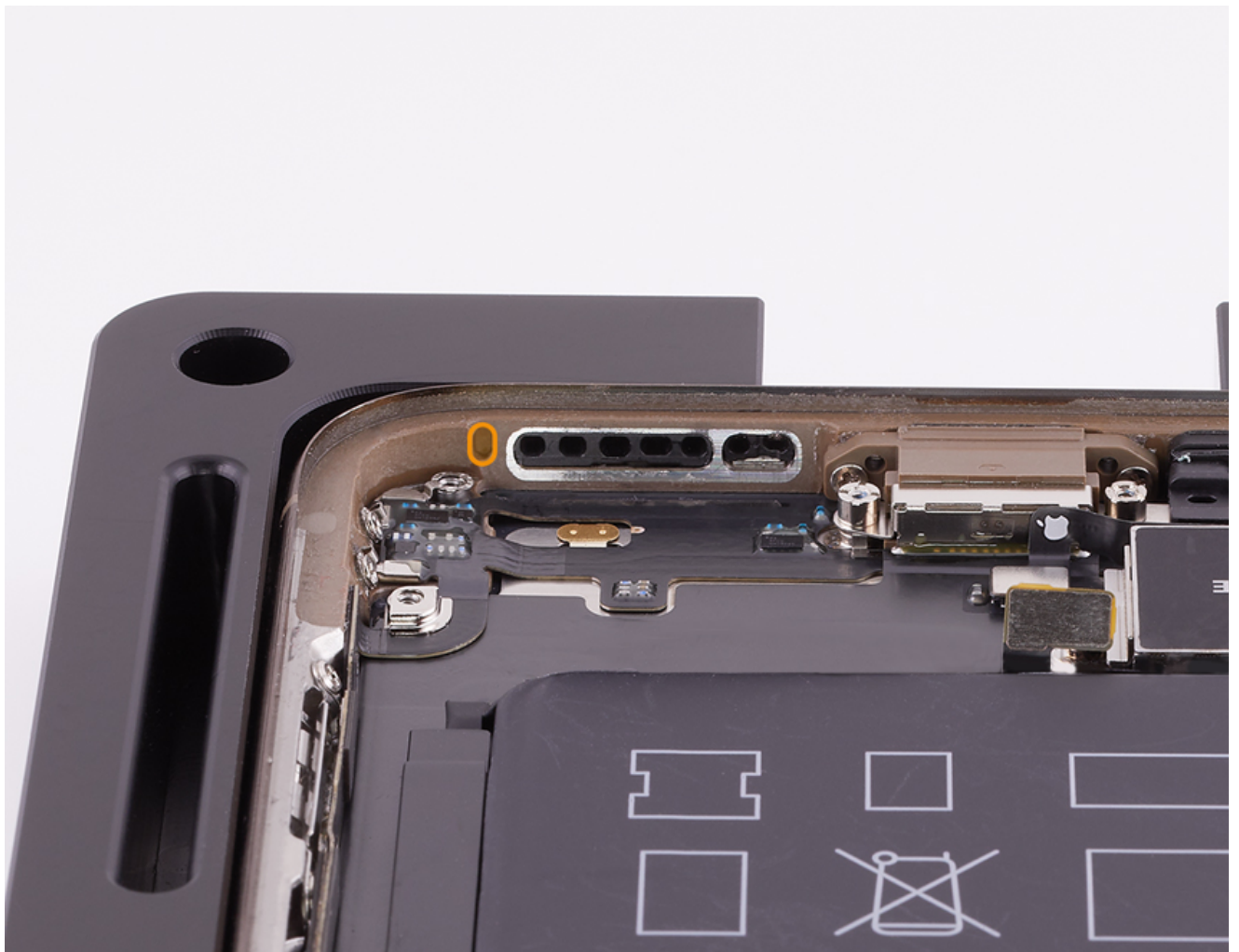


## Steps For Reassembly

**Important:** If you remove the speaker from the enclosure, you must replace it with a new speaker.

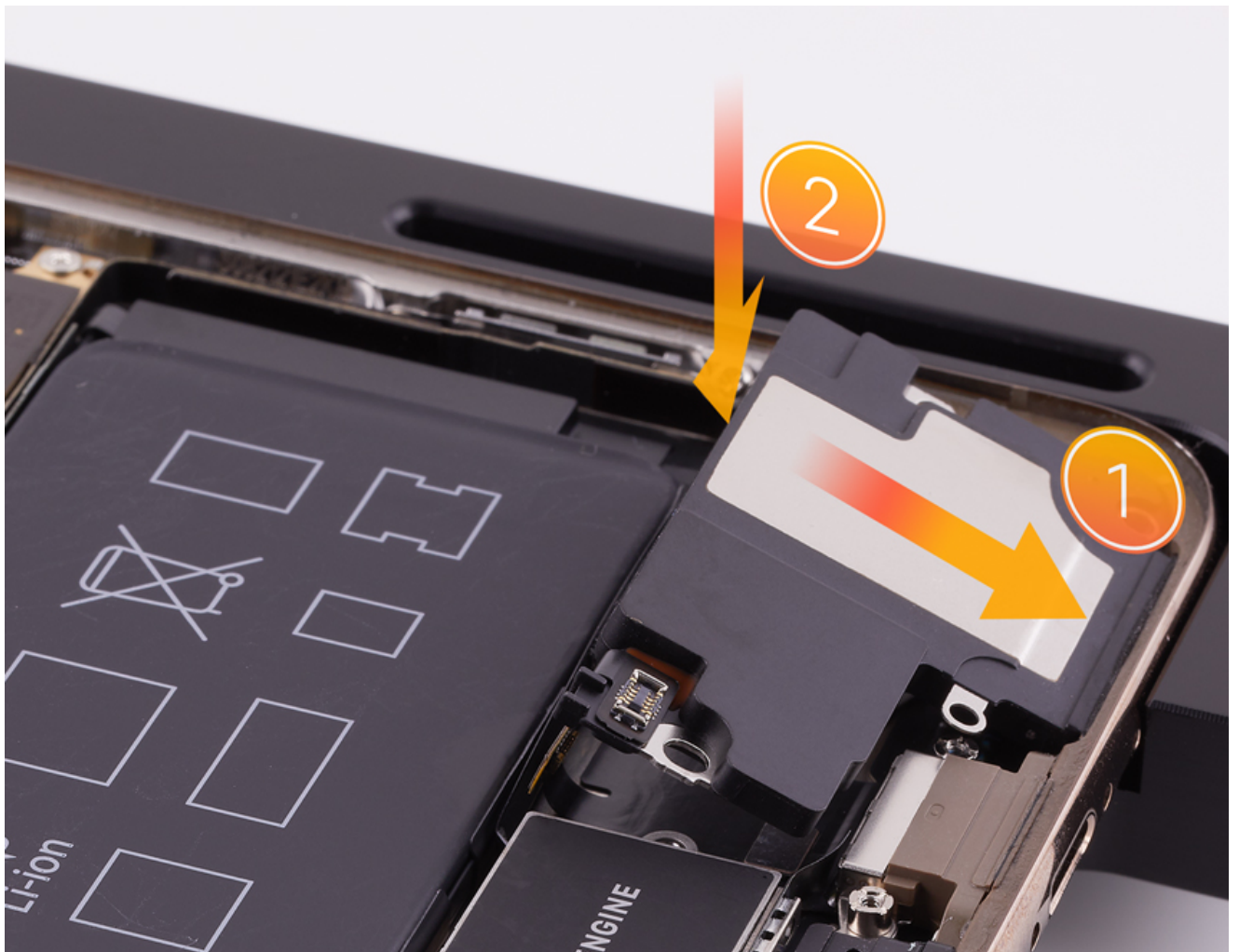
1. Remove the liner from the speaker foam gasket.
2. Align the pin on the speaker with the hole in the enclosure. The pin will be obscured when the foam is in place on a replacement speaker.



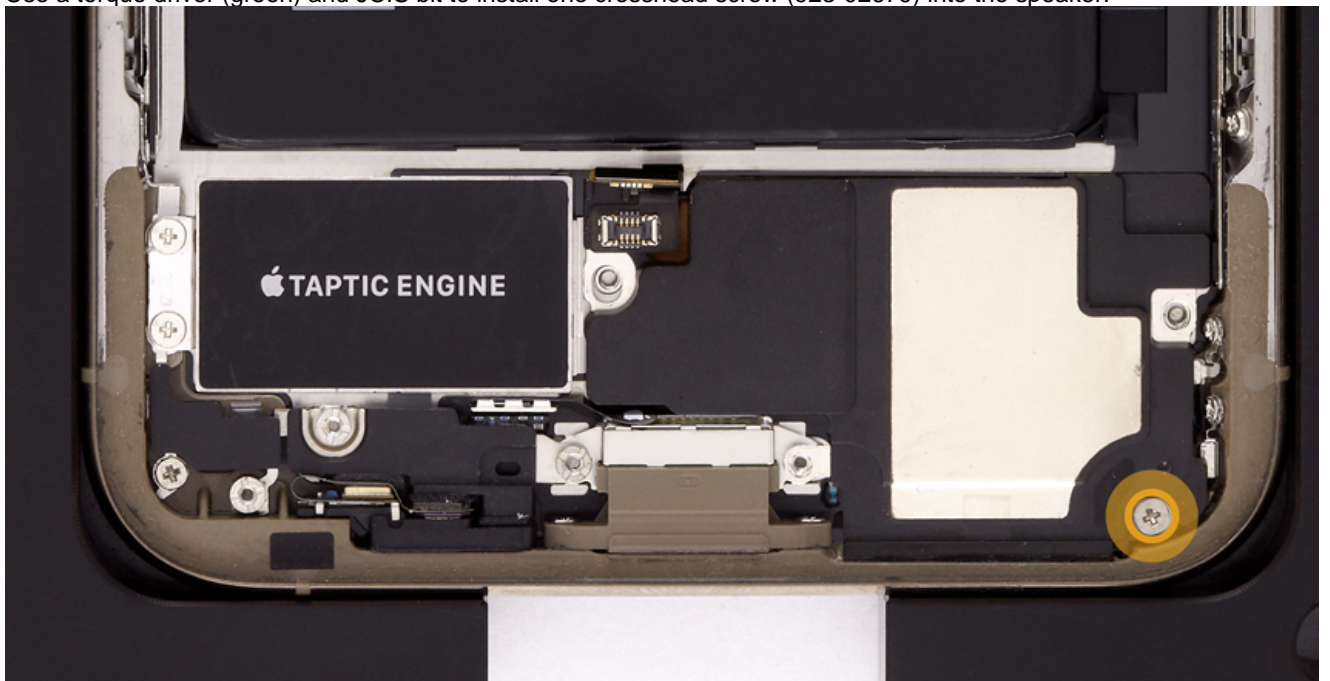


3. Carefully place the speaker into the enclosure. Do not touch the bottom of the enclosure with the adhesive on the speaker foam. Press and hold the speaker against the bottom of the enclosure to make sure the foam is adhered.  
**Important:** Avoid trapping the speaker flex underneath the speaker during installation.

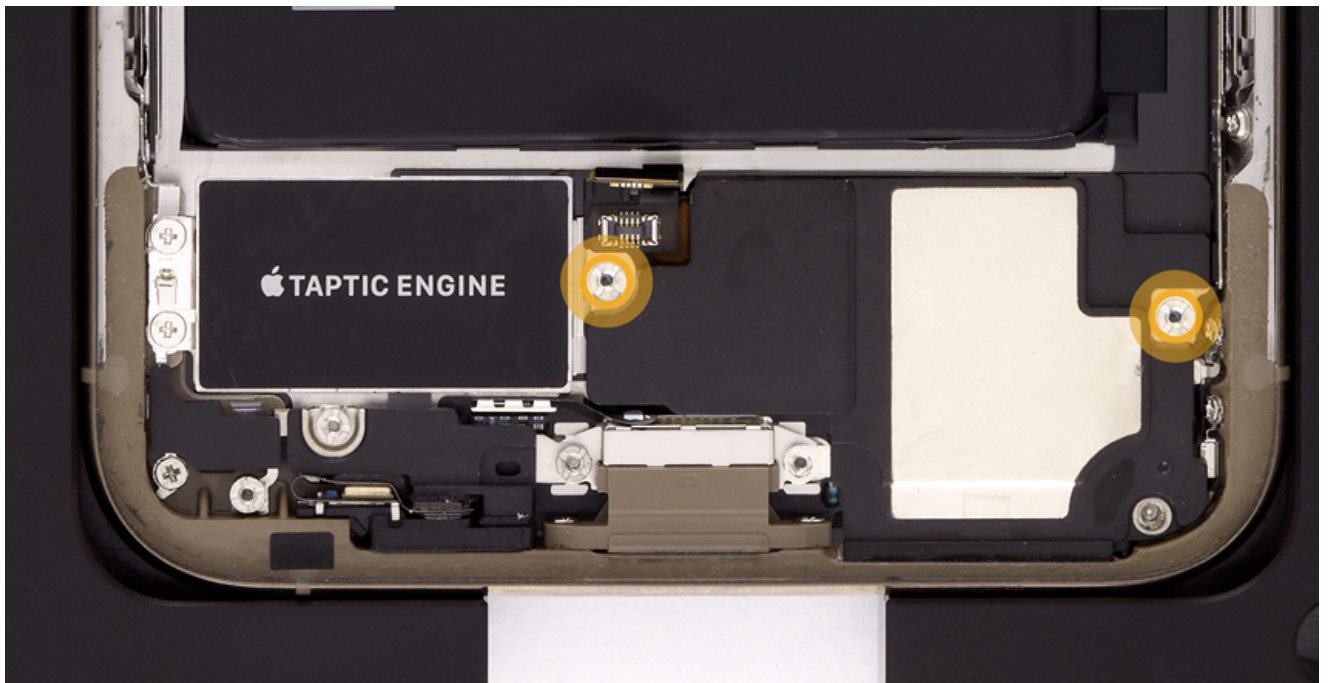




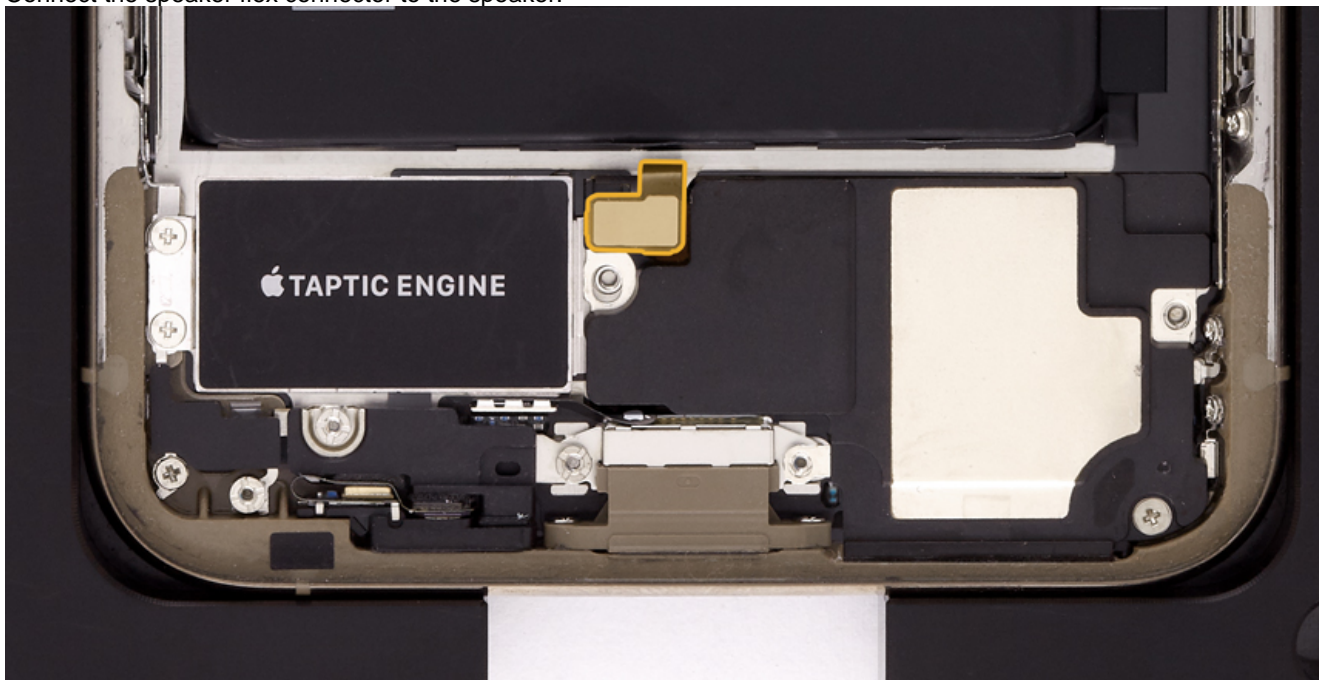
4. Use a torque driver (green) and JCIS bit to install one crosshead screw (923-02679) into the speaker.



5. Use a torque driver (gray) and superscrew bit to install two new superscrews into the speaker.  
 923-02684, left  
 923-02678, right

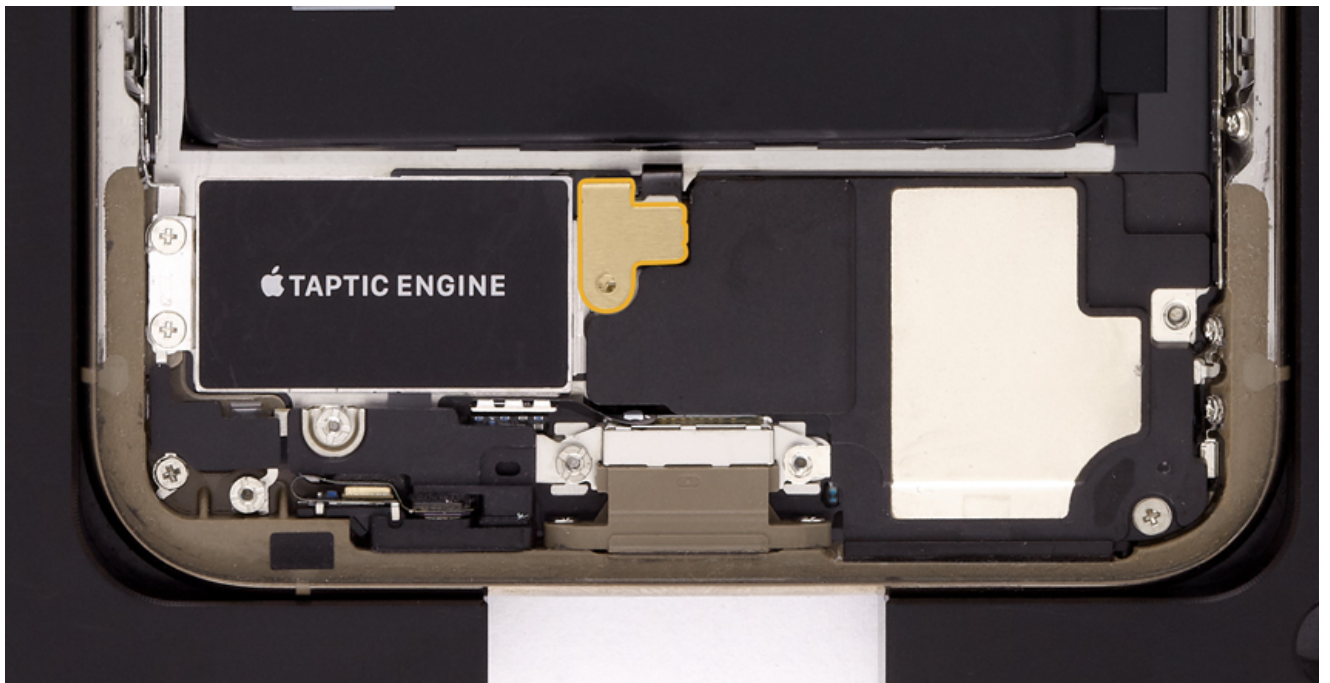


6. Connect the speaker flex connector to the speaker.

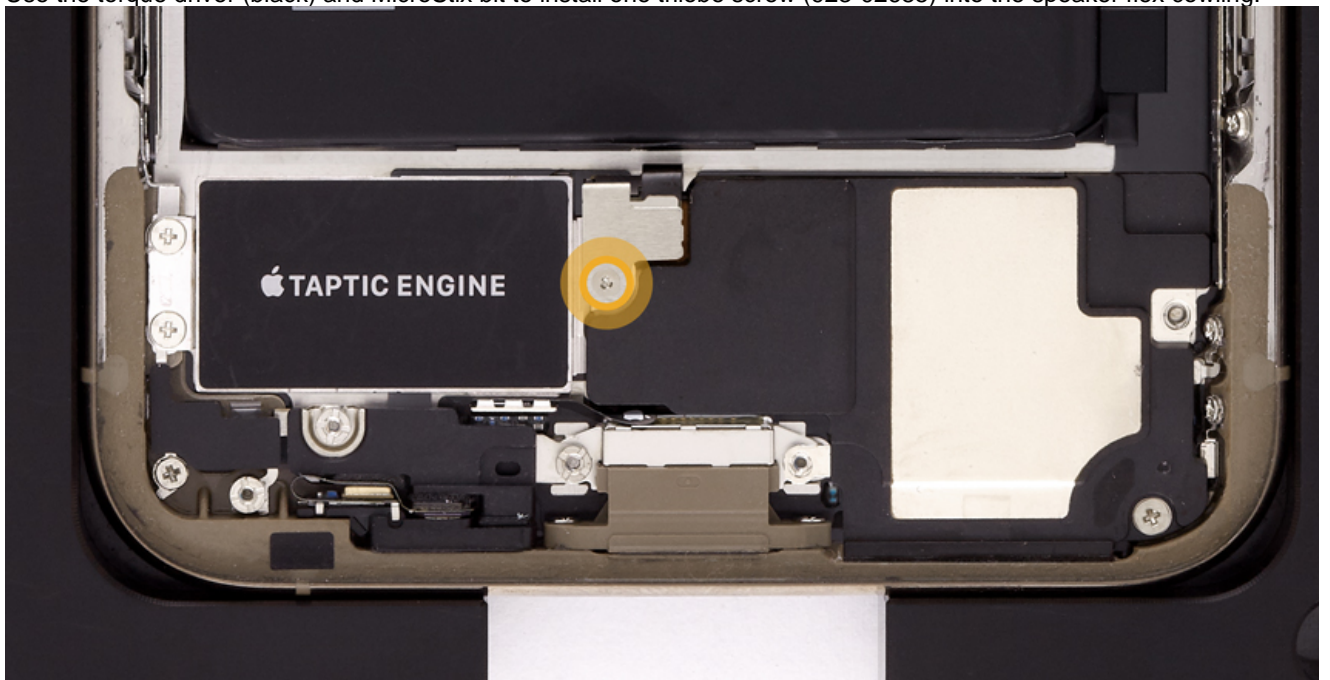


7. Place the speaker flex cowling (923-02677) on top of the speaker flex connector.

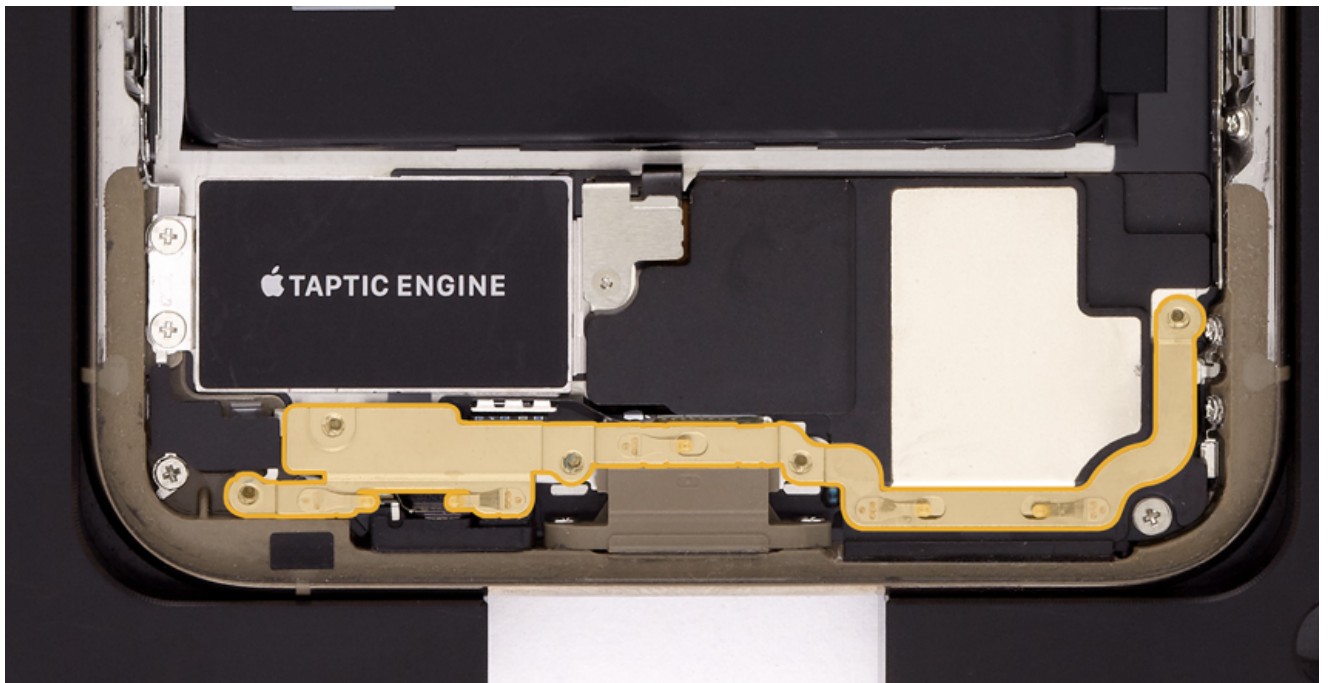




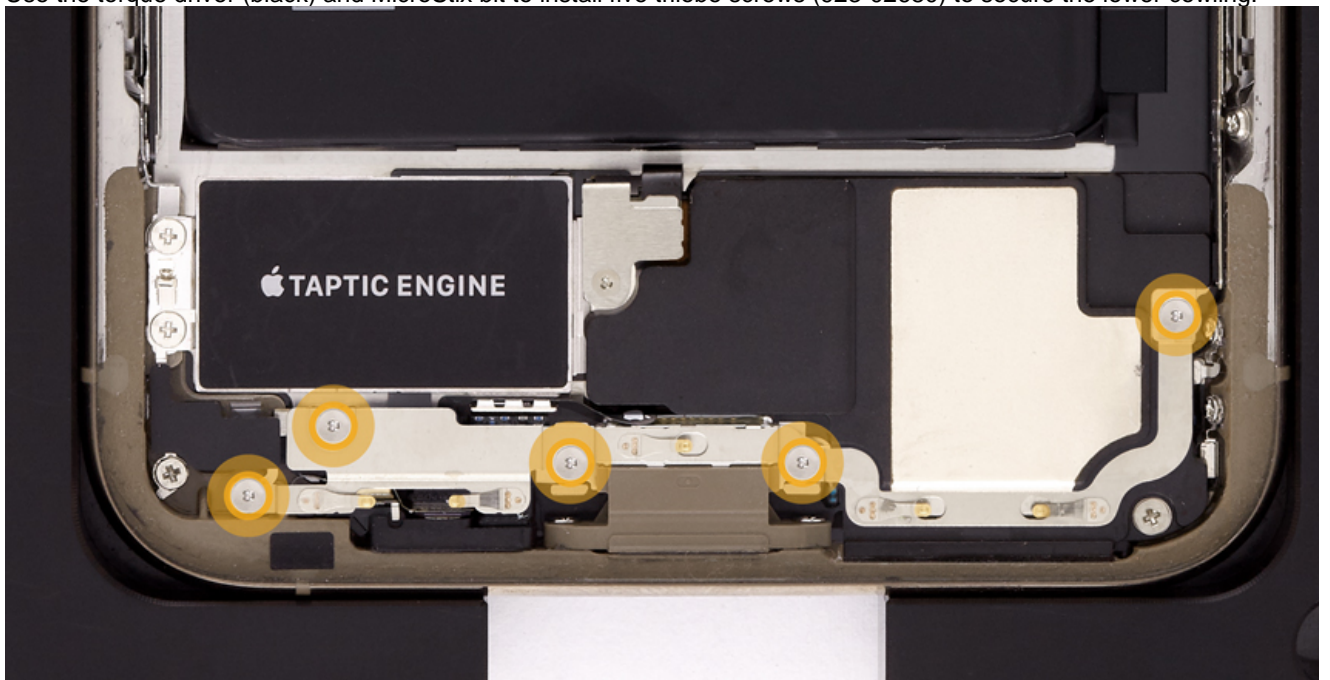
8. Use the torque driver (black) and MicroStix bit to install one trilobe screw (923-02685) into the speaker flex cowling.



9. Position the lower cowling (923-02674) in the enclosure.



10. Use the torque driver (black) and MicroStix bit to install five trilobe screws (923-02680) to secure the lower cowling.



11. Adhere the new battery shield (923-02835). Refer to [SV384: iPhone Xs Max Speaker Replacement Video](#) for video instruction for the recommended battery shield replacement method.
12. Follow the reassembly steps in [RP1443: Open Device](#).
13. **Important:** Check iPhone operation using the steps in [TP1045: Functional Test](#).

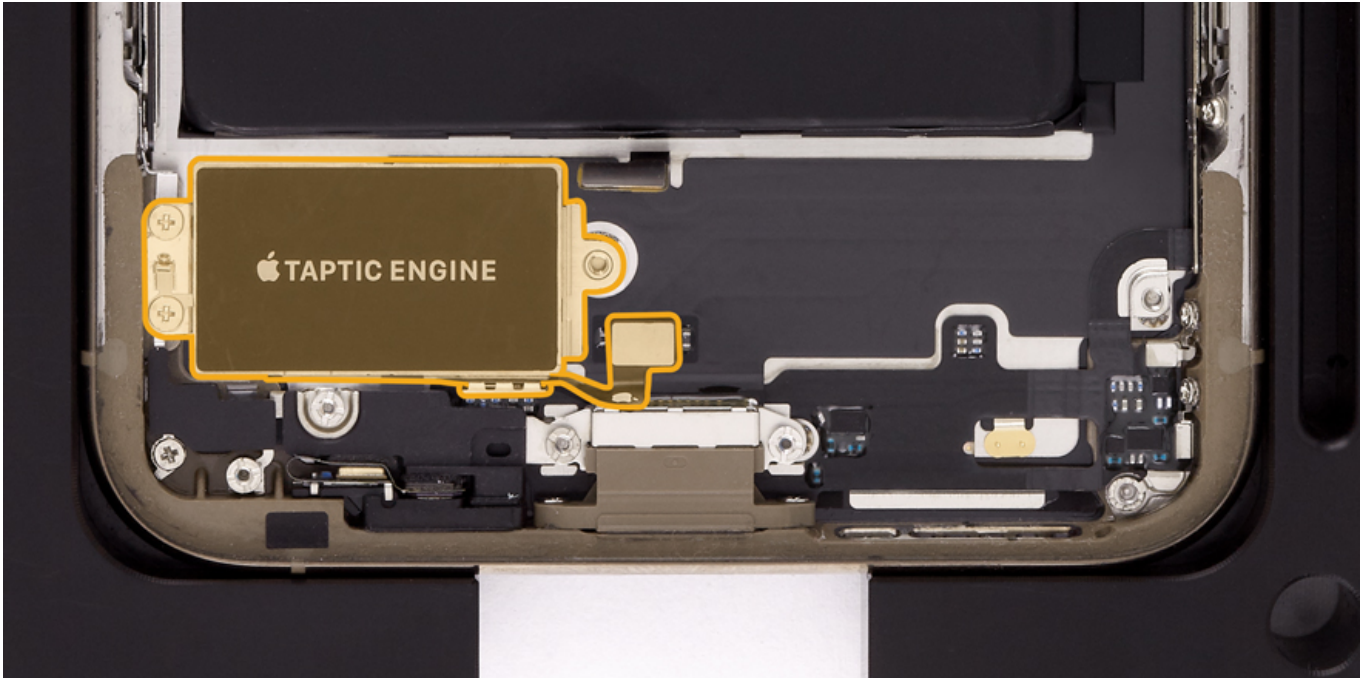
# iPhone Xs Max Taptic Engine

## First Steps

- Perform the [Open Device](#) procedure.
- Remove the [Speaker](#).

**Important:** Only Apple-certified technicians should perform this procedure.

Refer to [SV383: iPhone Xs Max Taptic Engine Replacement Video](#) for video instruction.



## Tools

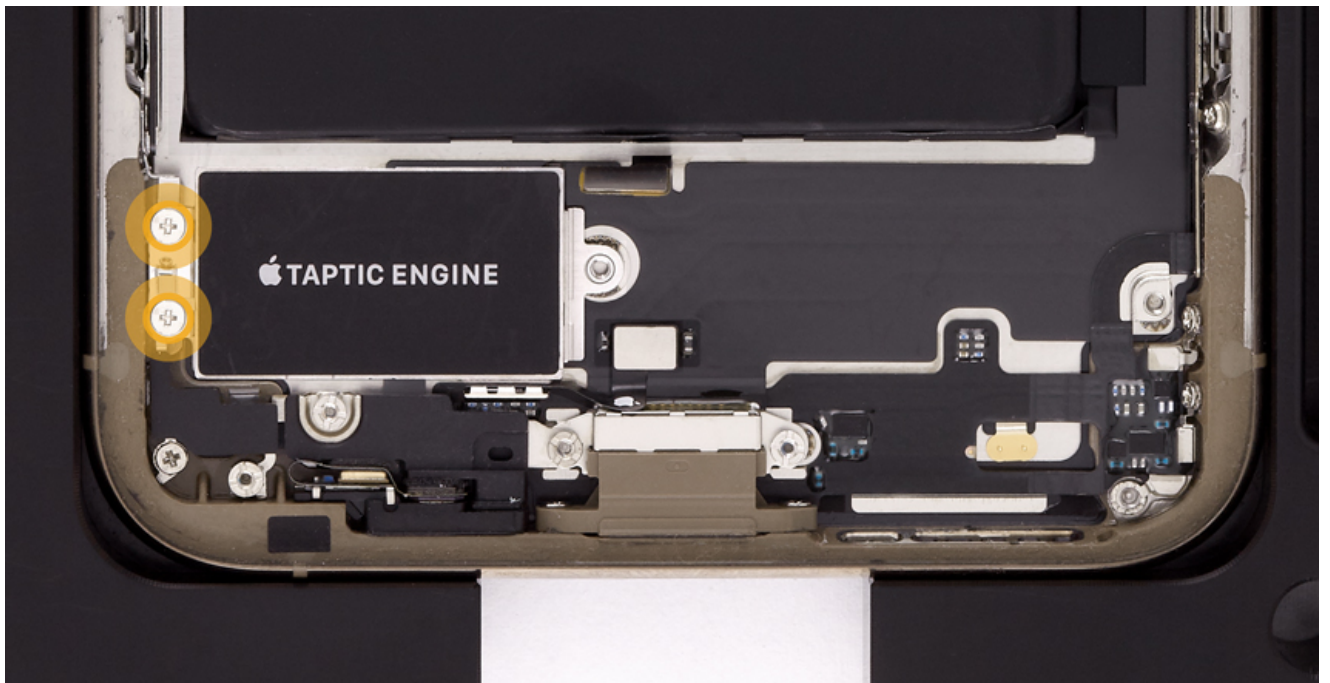
1. Torque driver (green) (923-00105)
2. JCIS bit for crosshead screws (923-0246)
3. ESD-safe tweezers
4. Black stick (922-5065)



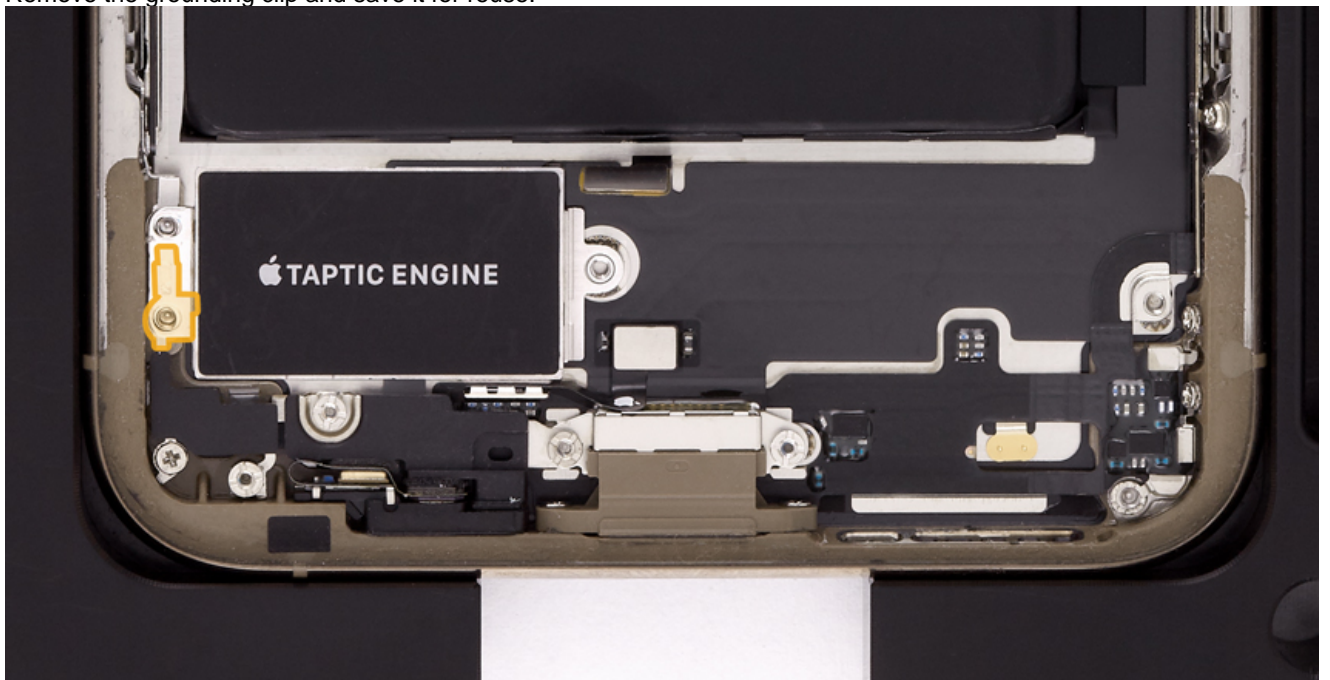
## Steps For Removal

1. Use the Torque driver and JCIS bit to remove and discard two crosshead screws from the Taptic Engine.

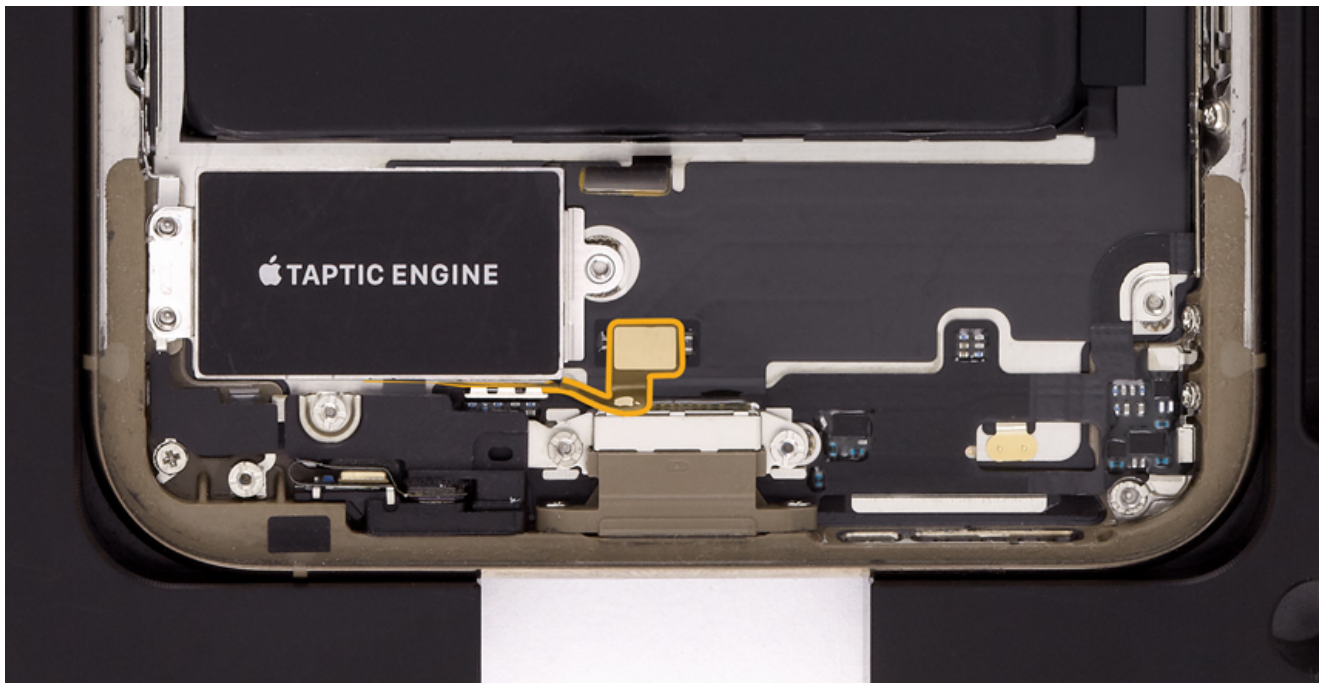




2. Remove the grounding clip and save it for reuse.



3. Use a black stick to disconnect the Taptic Engine flex connector.

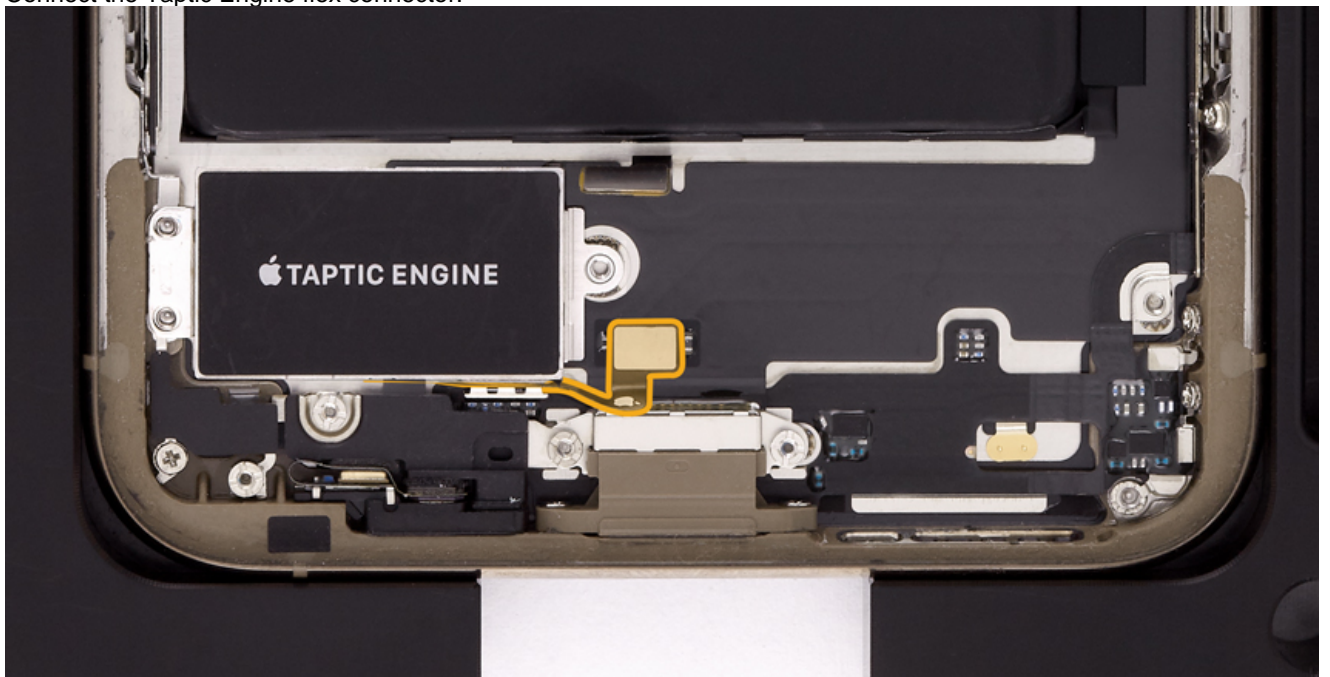


4. Remove the Taptic Engine.



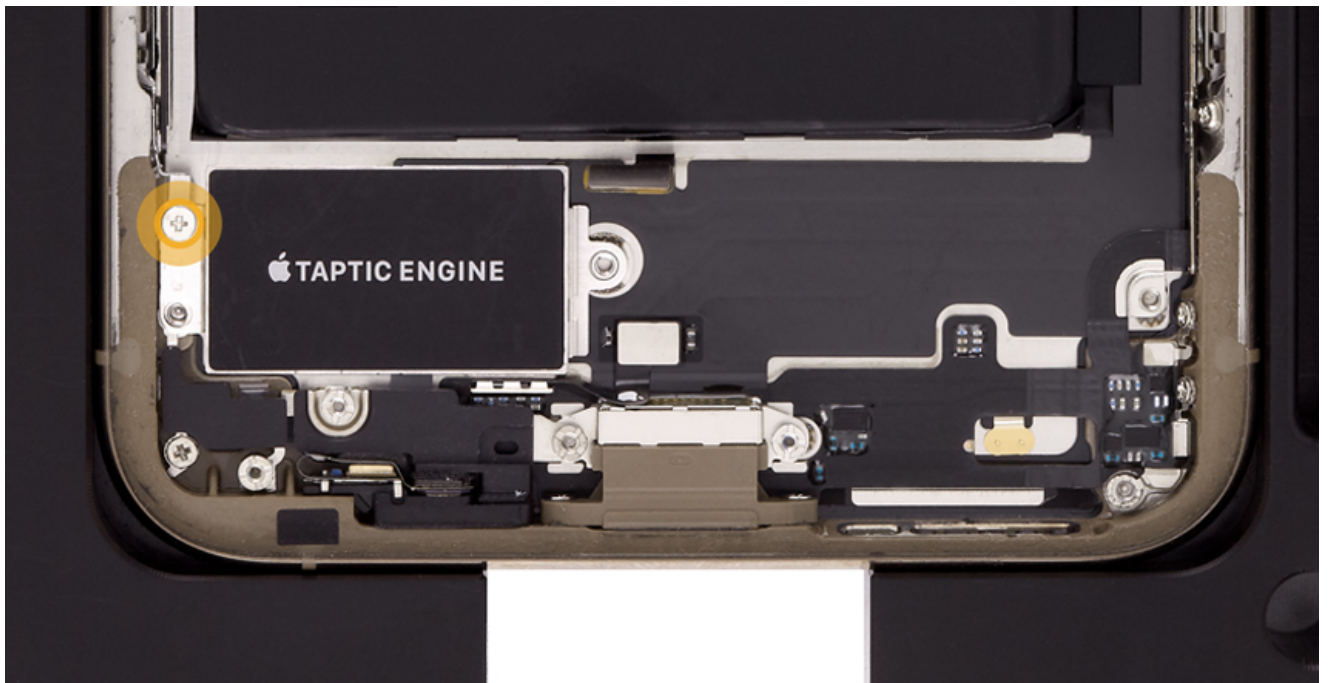
### Steps For Reassembly

1. Position the Taptic Engine in the enclosure.
2. Connect the Taptic Engine flex connector.

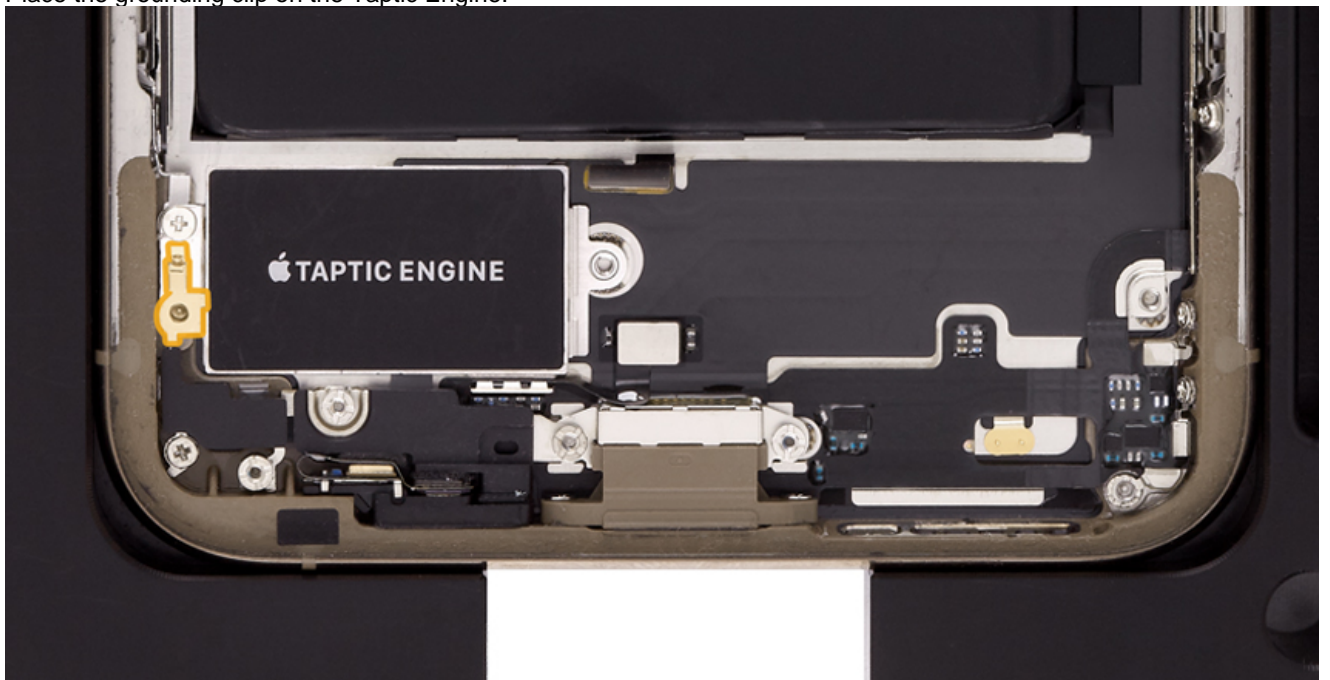


3. Use the torque driver (green) and JCIS bit to install one crosshead screw (923-02683) into the Taptic Engine.

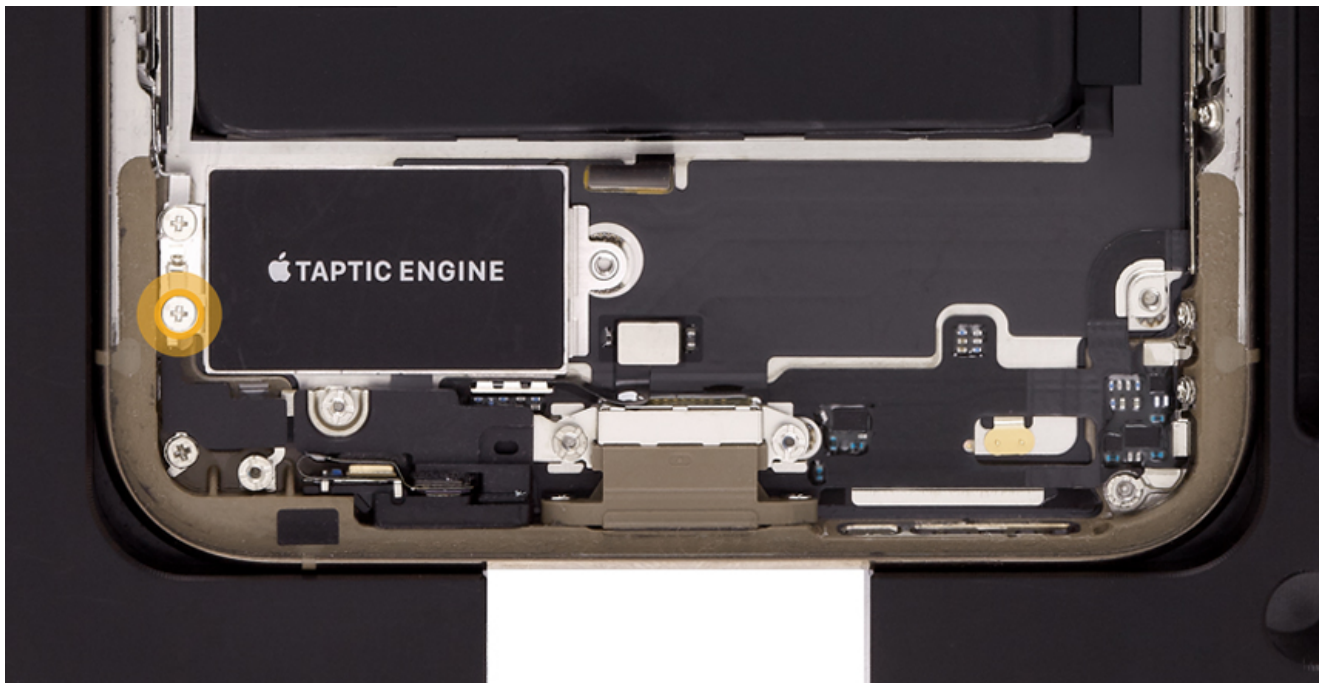




4. Place the grounding clip on the Taptic Engine.



5. Use the torque driver (green) and JCIS bit to install one crosshead screw (923-02683) into the Taptic Engine.



6. Install a new [Speaker](#).
7. Follow the reassembly steps in [RP1443: Open Device](#).
8. **Important:** Check iPhone operation using the steps in [TP1045: Functional Test](#).



# iPhone Xs Max Battery

## First Steps

- Review [TP328: iPhone Safety](#)
- Perform the [Open Device](#) procedure.
- Remove the [speaker](#).
- Remove the [Taptic Engine](#).

**Important:** Only Apple-certified technicians should perform this procedure.



**Warning:** If the battery is dented, punctured, swollen, or otherwise damaged, then stop the repair. Do not remove the battery from the device. Reassemble the device and replace the whole unit.

Refer to [TP328: iPhone Safety](#) and [HT204762: Enclosure separation due to expanded battery](#).

**Warning:** Do not reuse or reinstall a loose battery or a battery that has been removed. Replace it with a new battery. If a new battery is unavailable, replace the whole unit.

Refer to [SV381: iPhone Xs Max Battery Replacement Video](#) for video instruction.



## Tools

1. ESD-safe tweezers
2. Black stick (922-5065)
3. Isopropyl alcohol (IPA) wipes
4. 6.5-inch repair tray (923-02662)
5. iPhone Battery Fixture (923-02657)
6. Nitrile or lint-free gloves



2



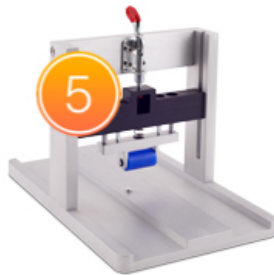
3



4



5

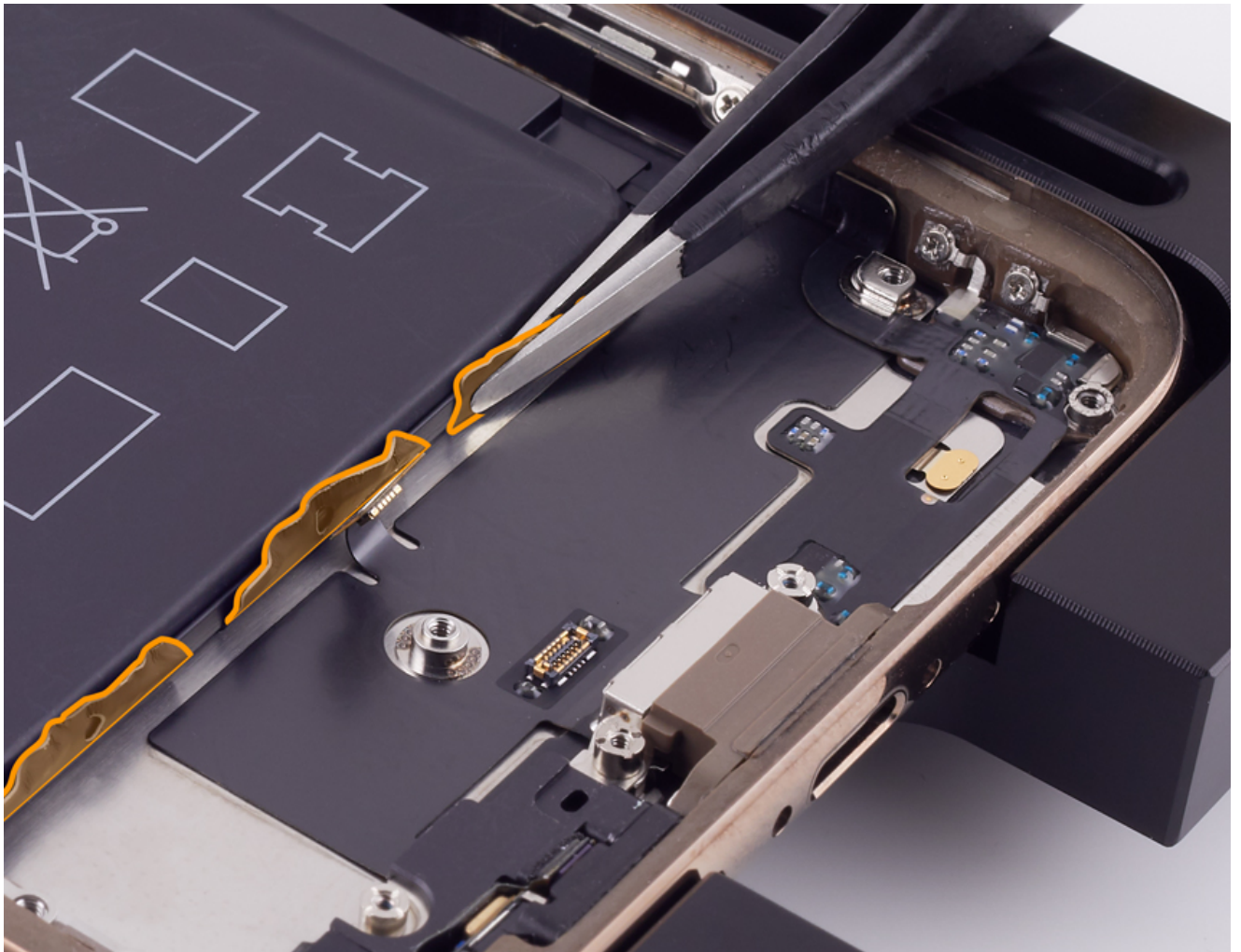


6



## Steps For Removal

1. Use ESD-safe tweezers to gently lift the bottom battery adhesive tabs from the battery.



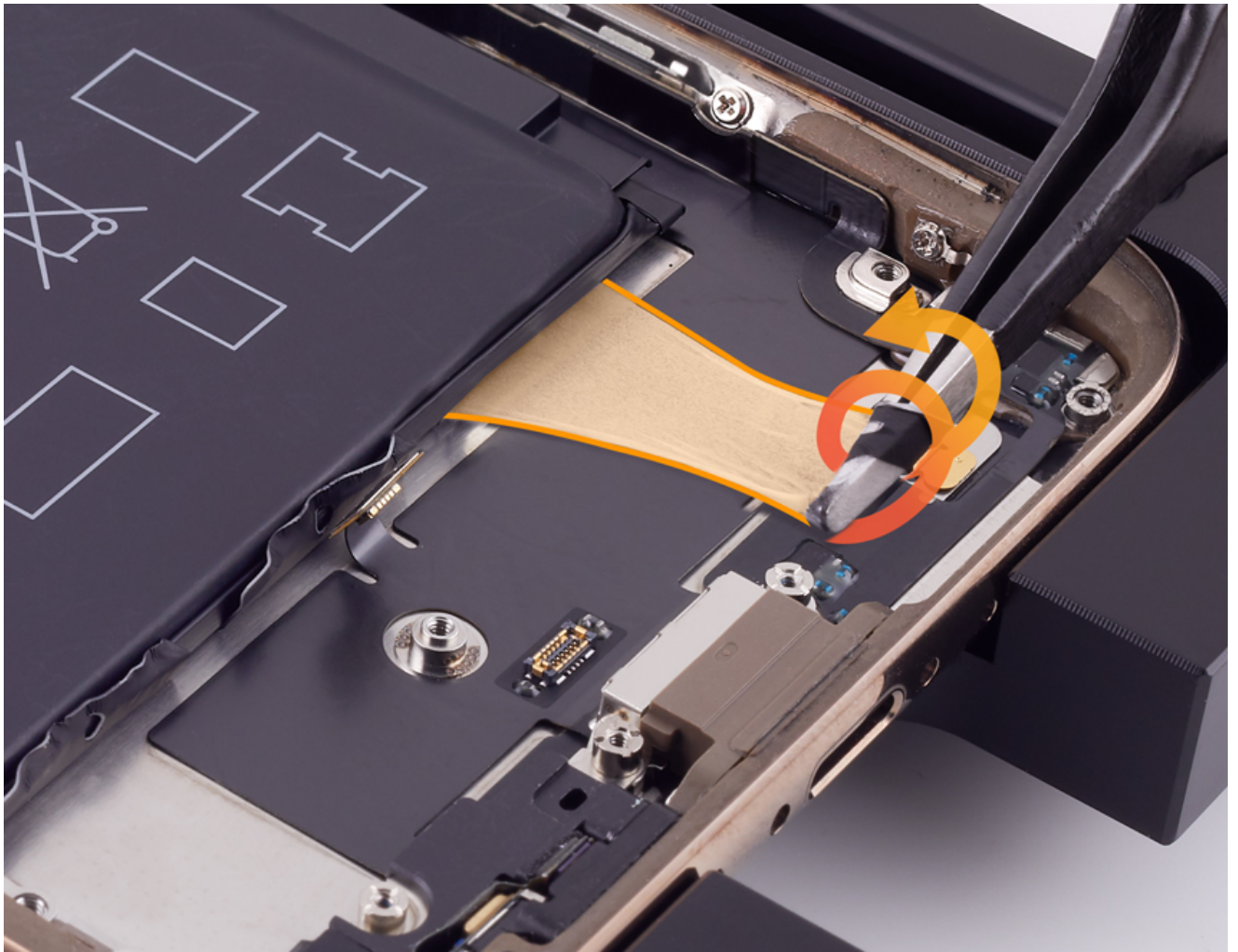
2. Hold down the battery with one hand. With the other hand, use the ESD-safe tweezers to grasp one battery adhesive tab and slowly pull it toward the bottom of the iPhone. Twist the tweezers to wrap the battery adhesive tab around it. As the battery adhesive strip extends, continue to twist and slowly pull it with the tweezers. **Important:** Avoid pulling the battery adhesive strip against components or screws.

**Note:** If a battery adhesive strip breaks, then attempt to retrieve the strip with ESD-safe tweezers. If the remaining battery adhesive strip cannot be retrieved, then attempt to remove other battery adhesive strips.

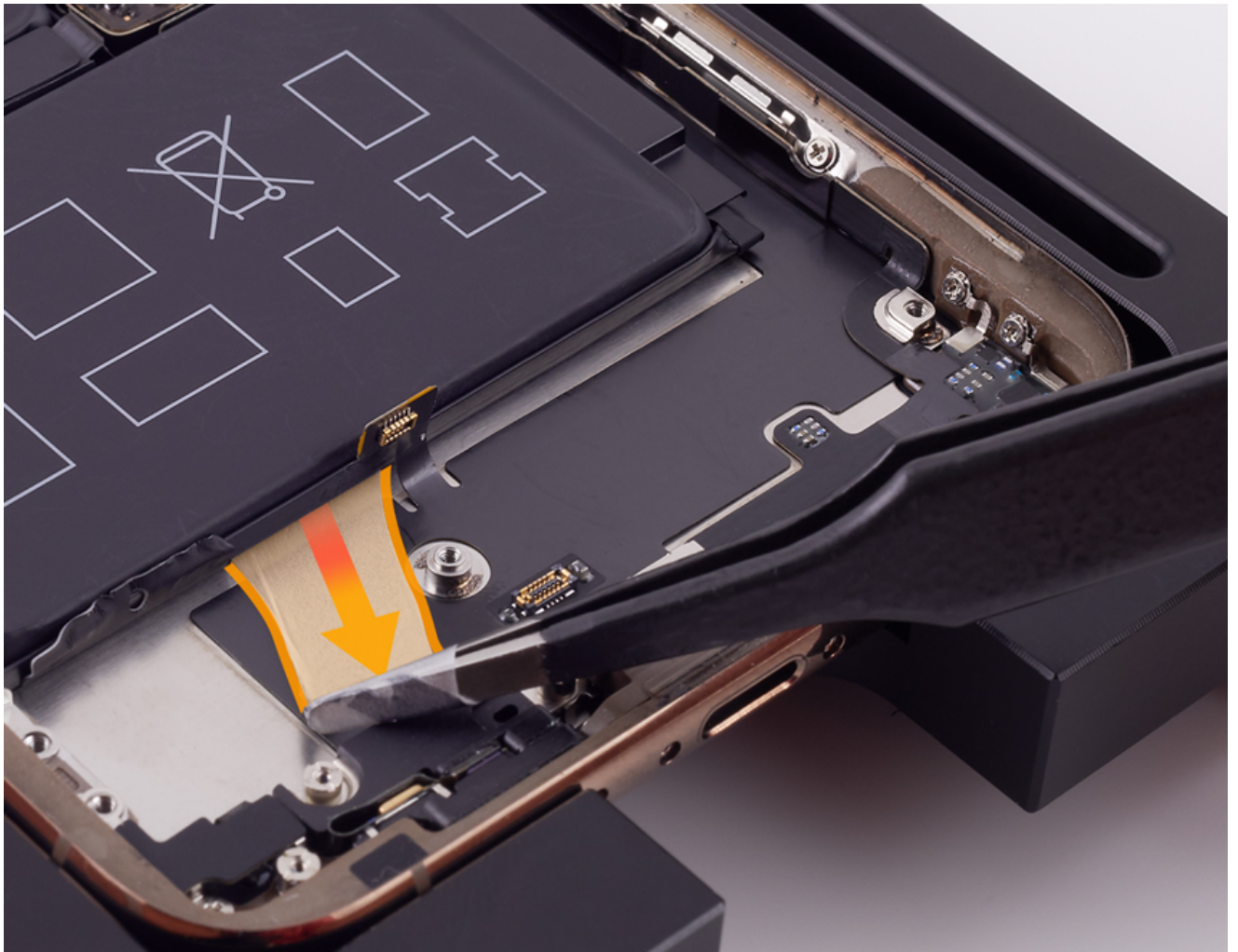


**Warning:** If a battery adhesive tab or strip breaks off and cannot be retrieved, then replace the whole unit. Do not use tools to pry the battery.



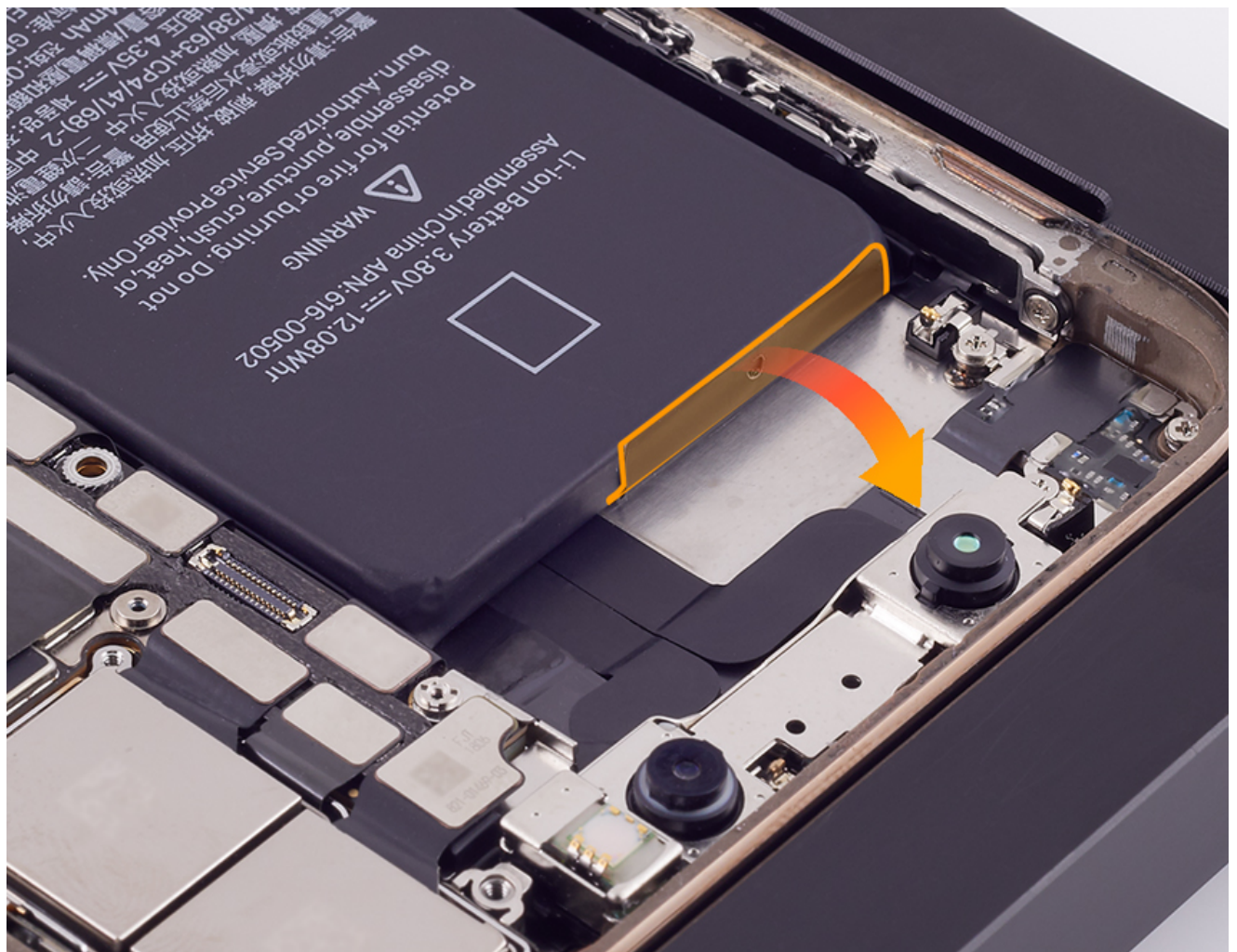


3. Continue to pull slowly until the battery adhesive strip releases.
4. Repeat steps 2 and 3 with the remaining battery adhesive tabs. Avoid pulling the middle battery adhesive strip against the speaker flex connector.



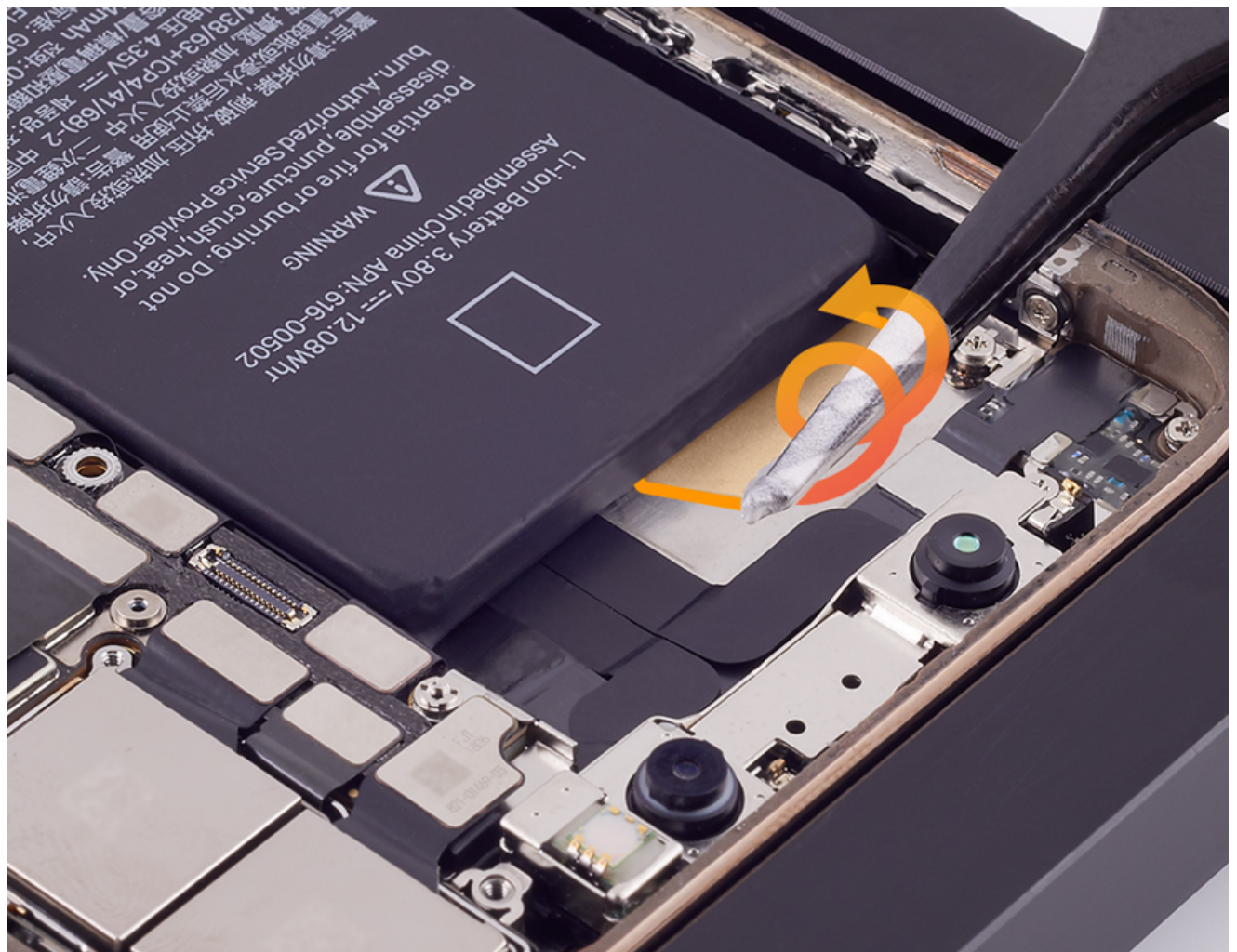
5. Put on nitrile or lint-free gloves. Use ESD-safe tweezers to gently lift the top battery adhesive tab from the battery.  
**Important:** Avoid touching the TrueDepth cameras and nearby components.





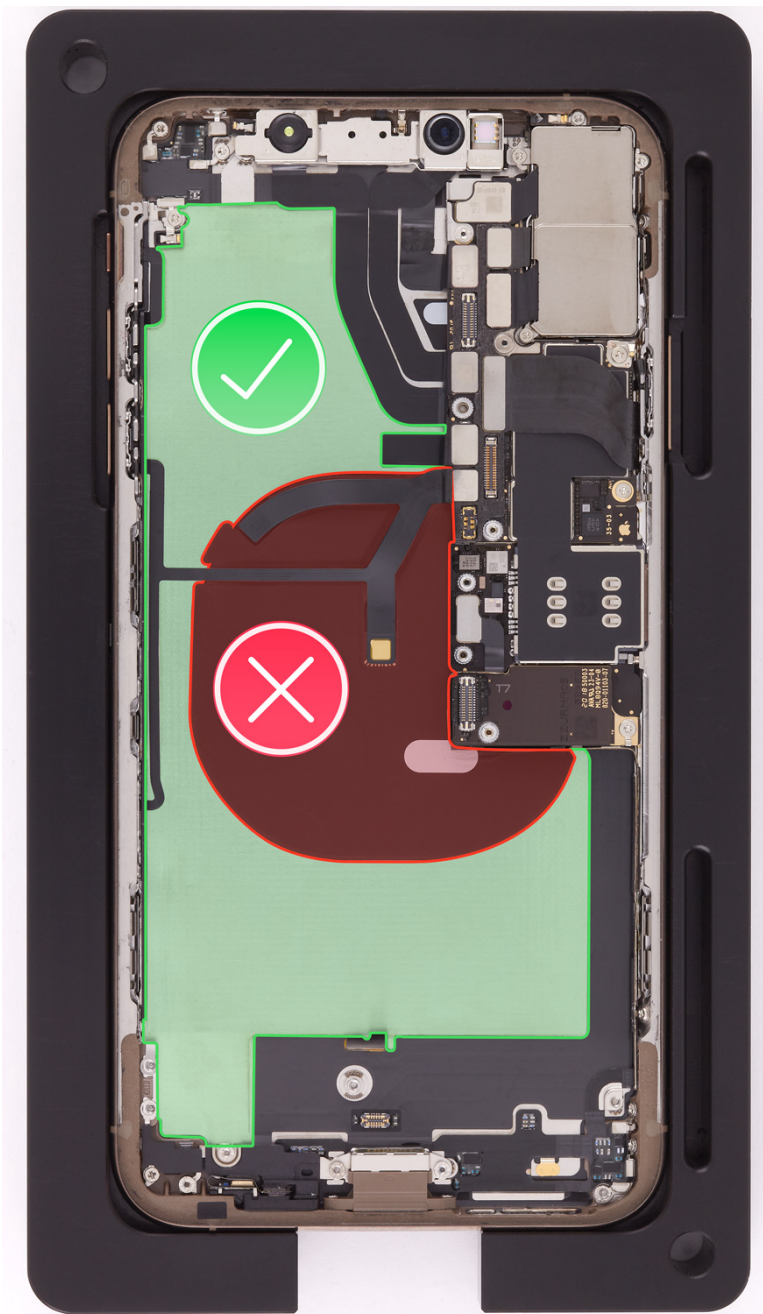
6. Hold down the battery with one hand. With the other hand, use the ESD-safe tweezers to grasp the top battery adhesive tab and slowly pull it toward the top of the iPhone. Twist the tweezers to wrap the battery adhesive tab around it. As the battery adhesive strip extends, continue to twist and slowly pull it with the tweezers. **Important:** Avoid touching the TrueDepth cameras and nearby components.

**Note:** If the battery adhesive strip breaks, then attempt to retrieve the strip with ESD-safe tweezers.



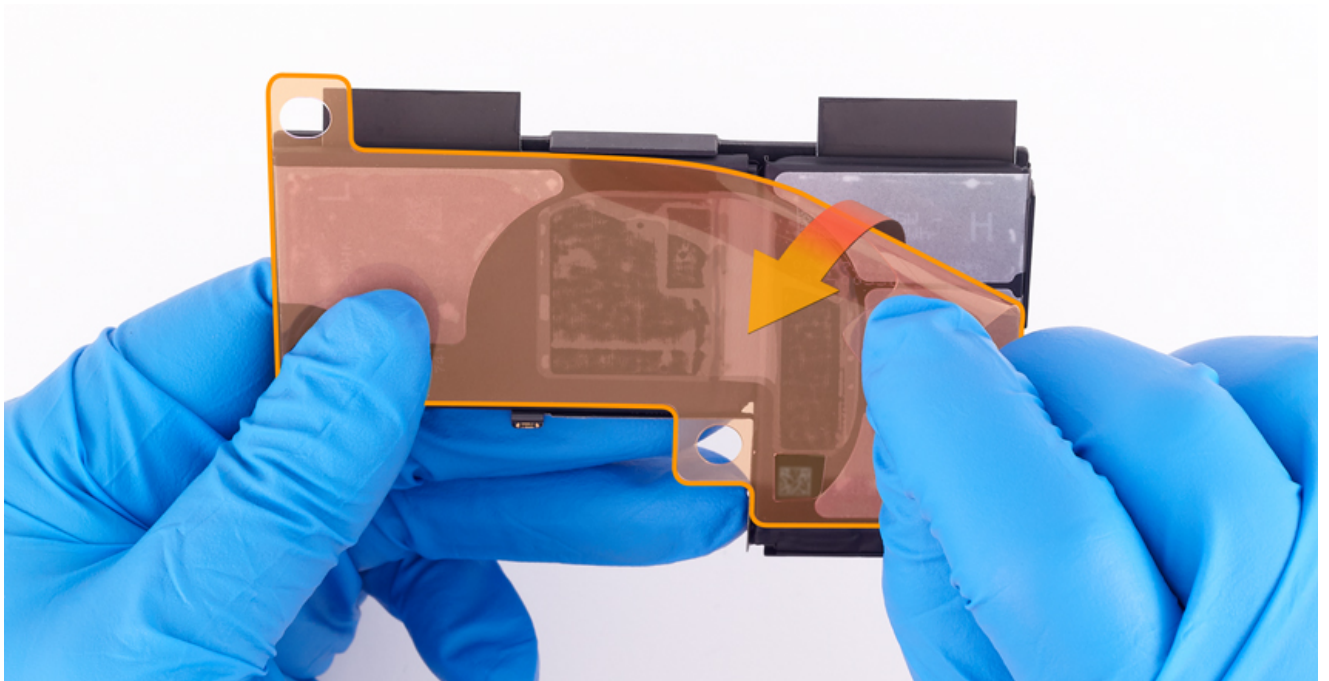
7. Remove the battery from the enclosure. Support both parts of the battery to avoid damaging the battery.
8. Use IPA wipes in the area outlined in green in the image below to remove any remaining adhesive from the enclosure underneath the battery. **Important:** Avoid the area outlined in red in the image below as IPA wipes may cause damage to the mylar.



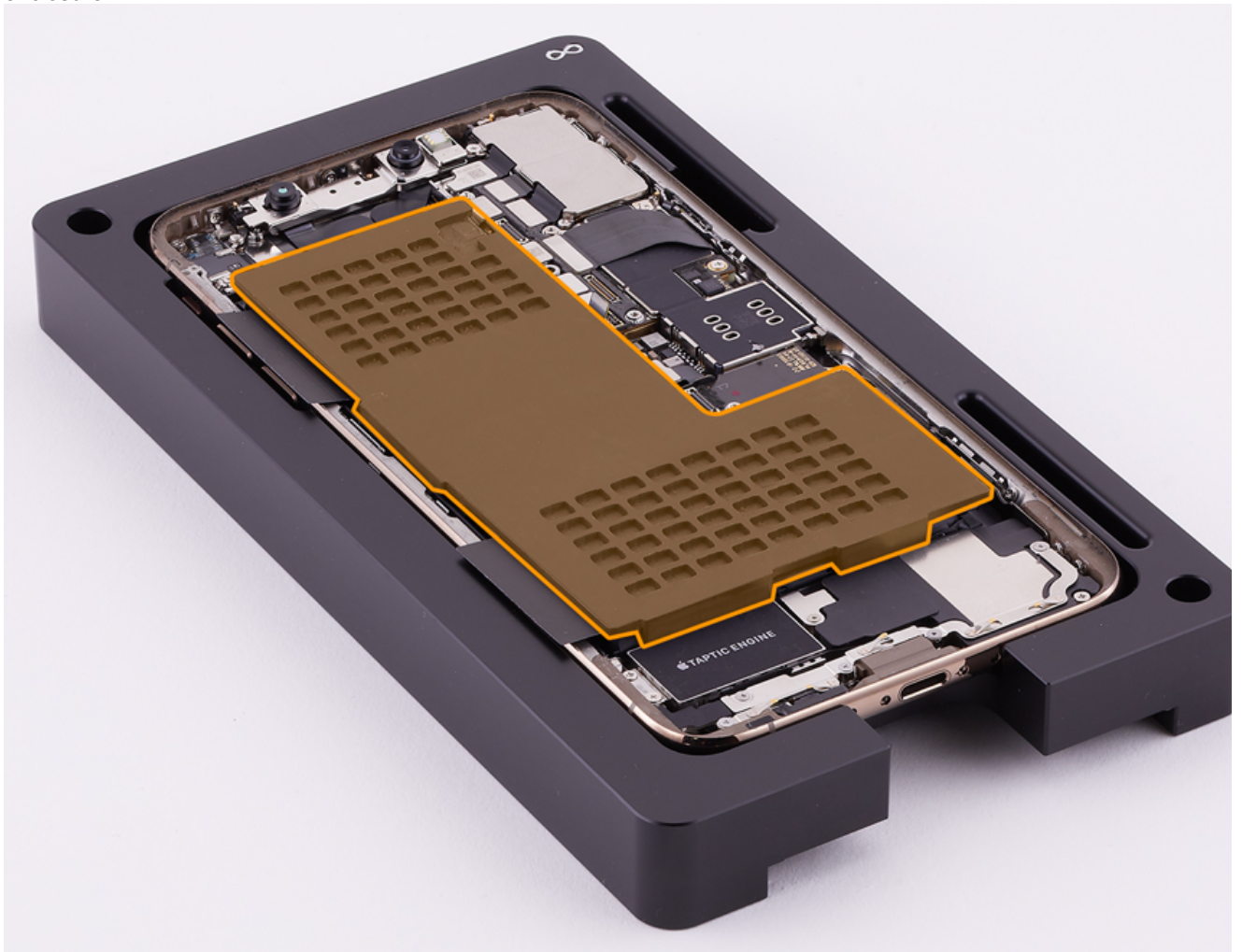


## Steps For Reassembly

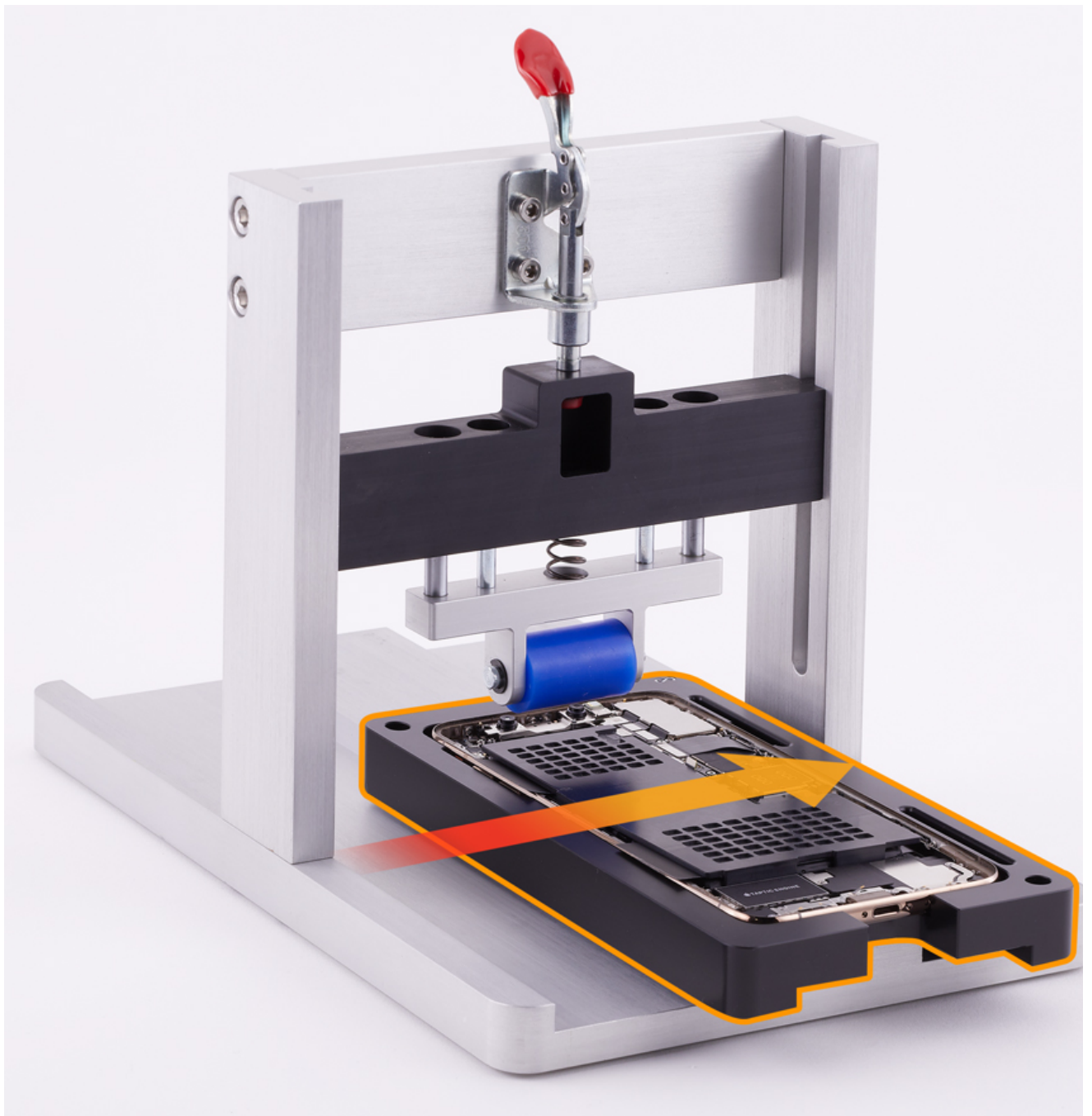
1. Reinstall the [Taptic Engine](#).
2. Install a new [speaker](#).
3. Peel the pink release liner from the battery to expose the adhesive that will attach to the enclosure. Do not remove the protective cover.



4. Position the battery in the enclosure without adhering it into the enclosure. Align the battery against the left edge of the enclosure and slide it down to make contact with the Taptic Engine and speaker. Then lower the battery into the enclosure.

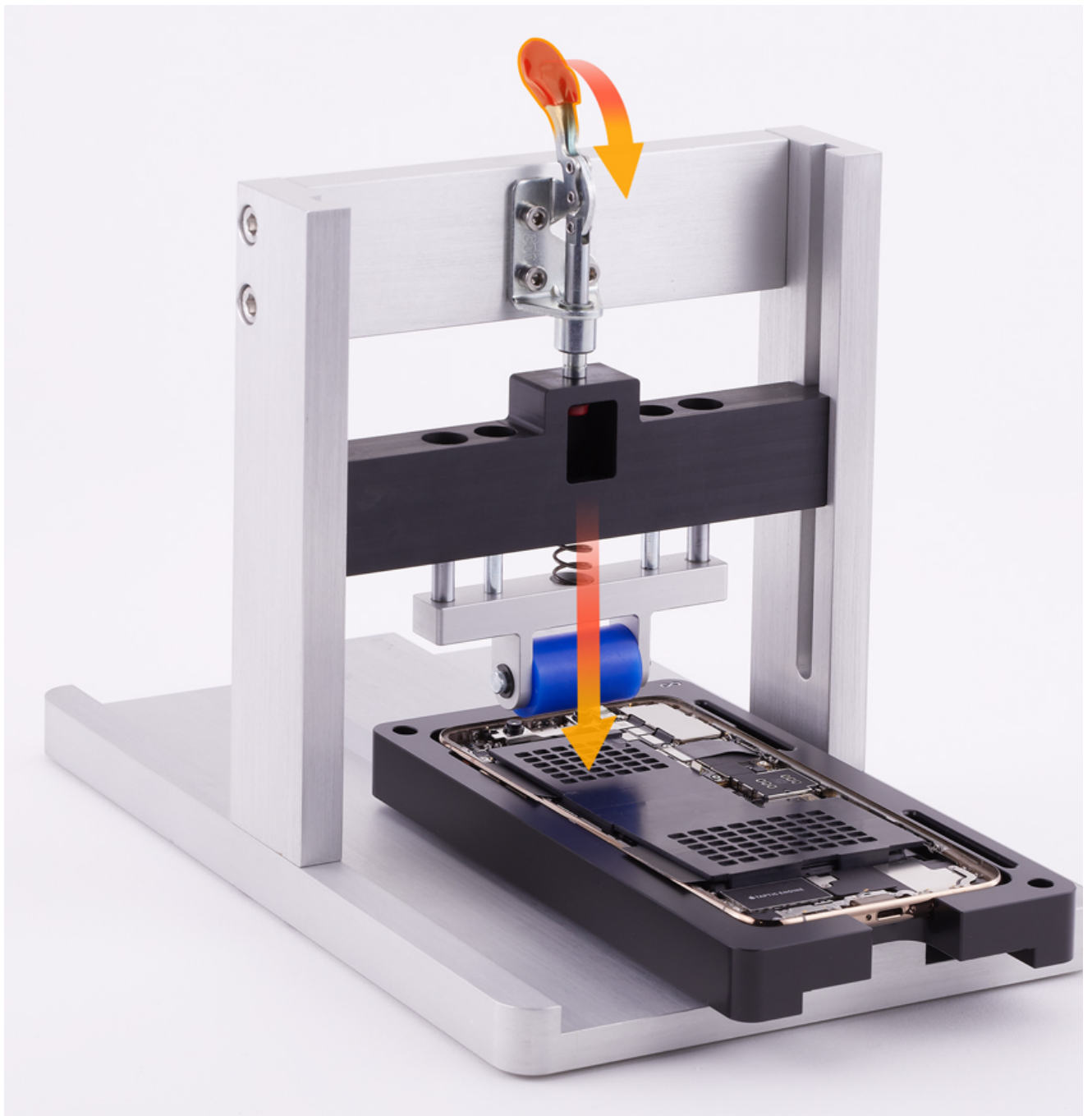


5. Make sure that the alignment pin of the iPhone Battery Fixture roller is in the longer slot of the repair tray.

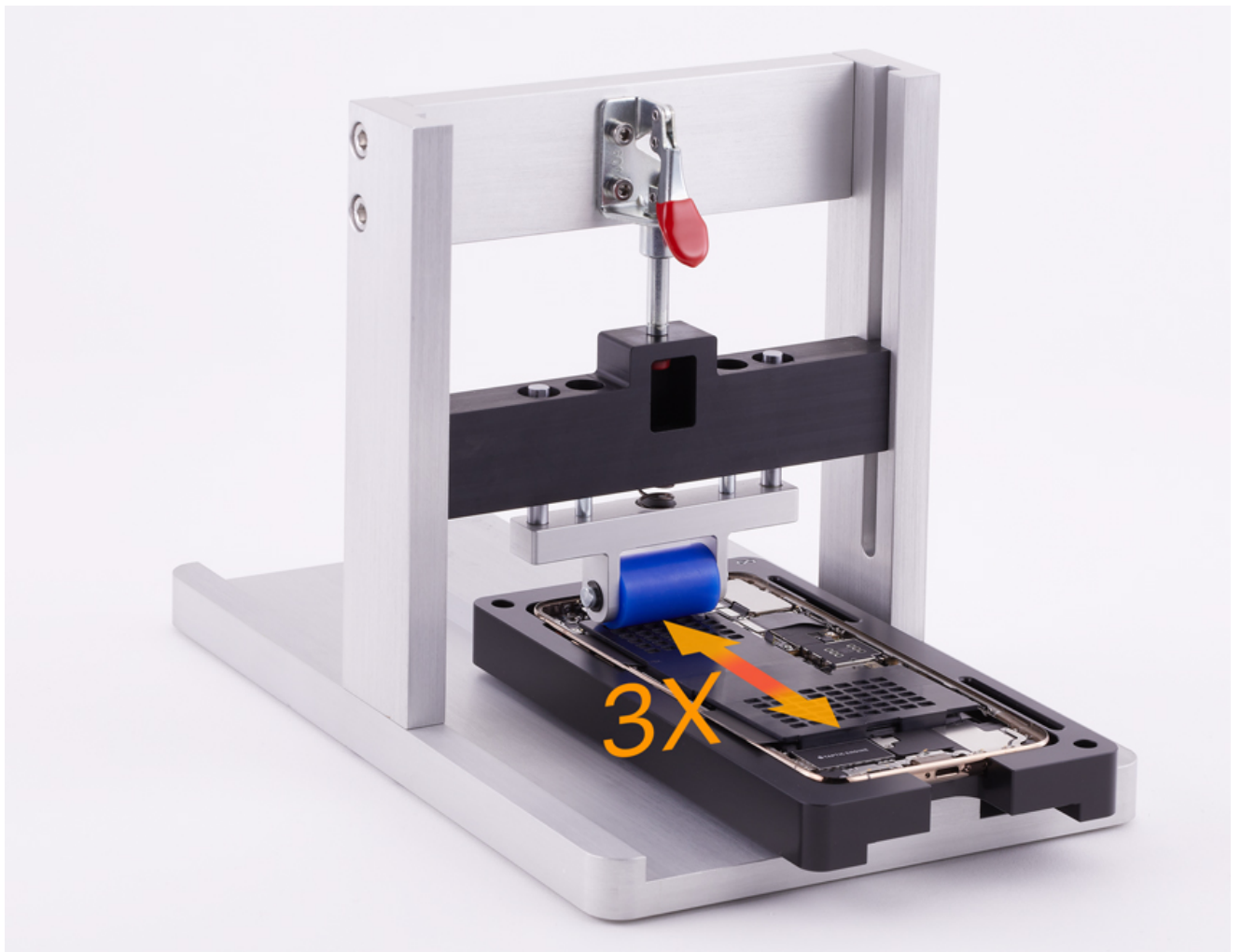


6. Lower the red lever to move the pressure roller into place above the iPhone battery.

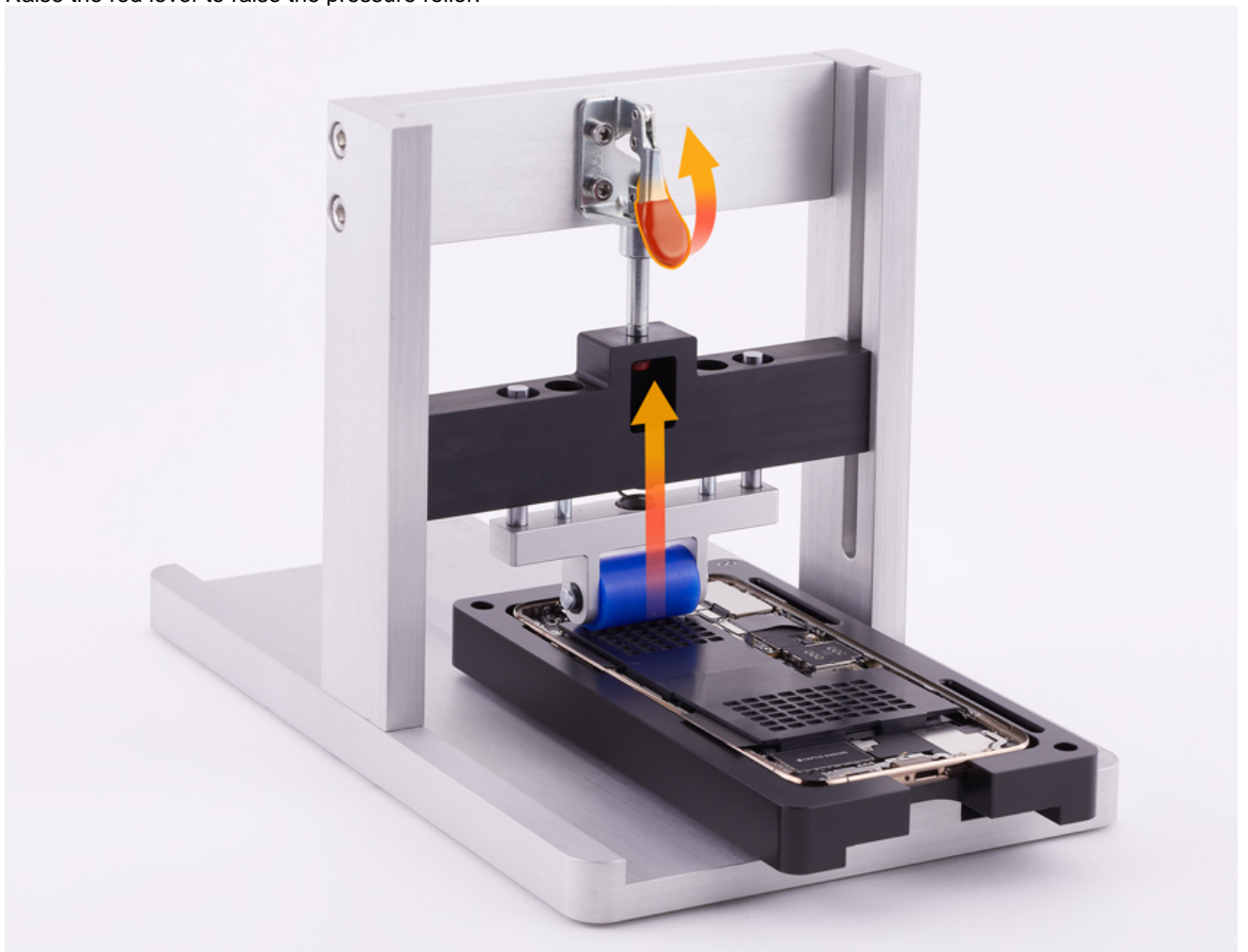




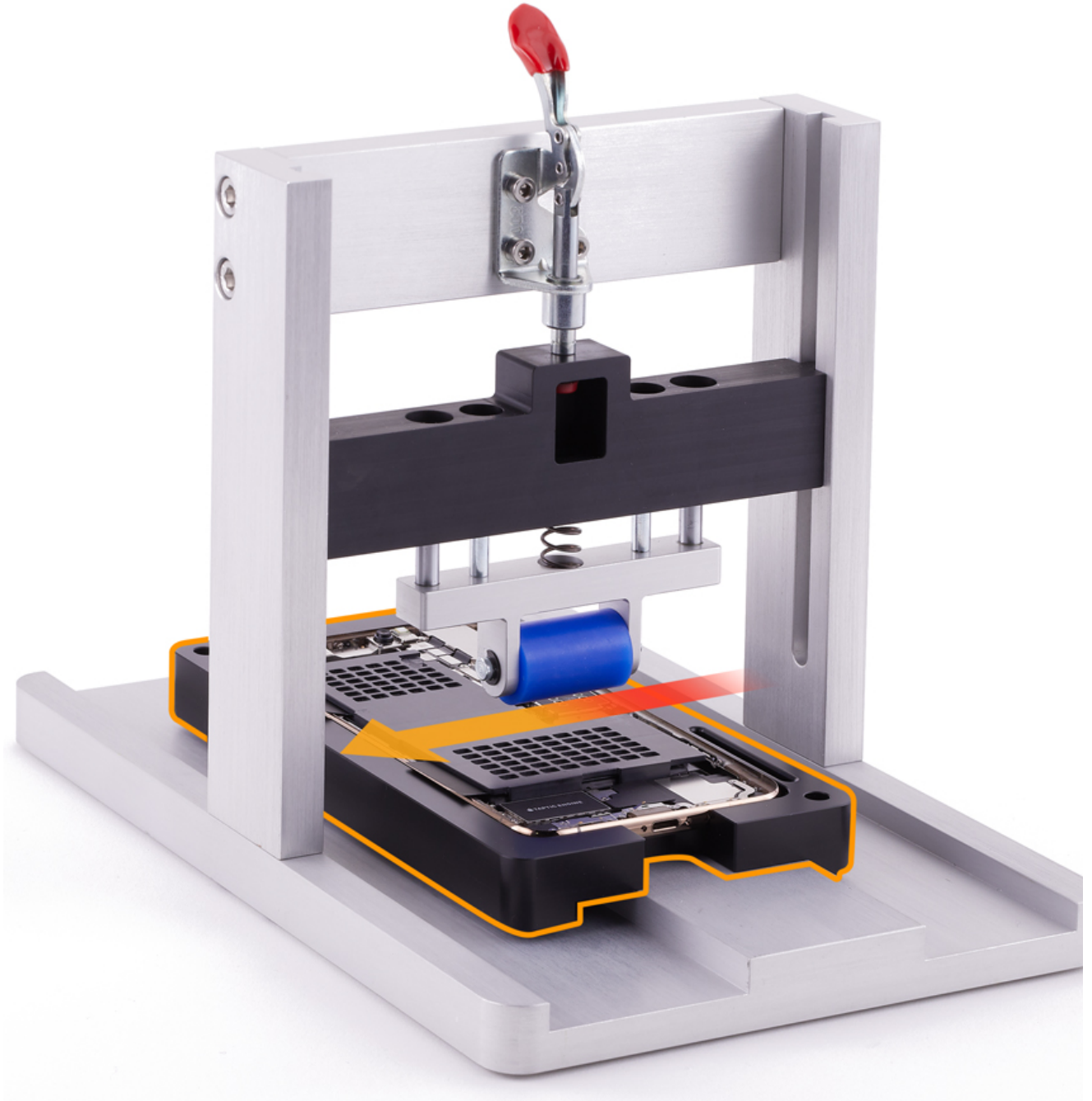
7. Slide the tray through the tower until it is at the end of the range of motion. Repeat three times. This will cause the roller to press the battery down onto the adhesive strips.



8. Raise the red lever to raise the pressure roller.

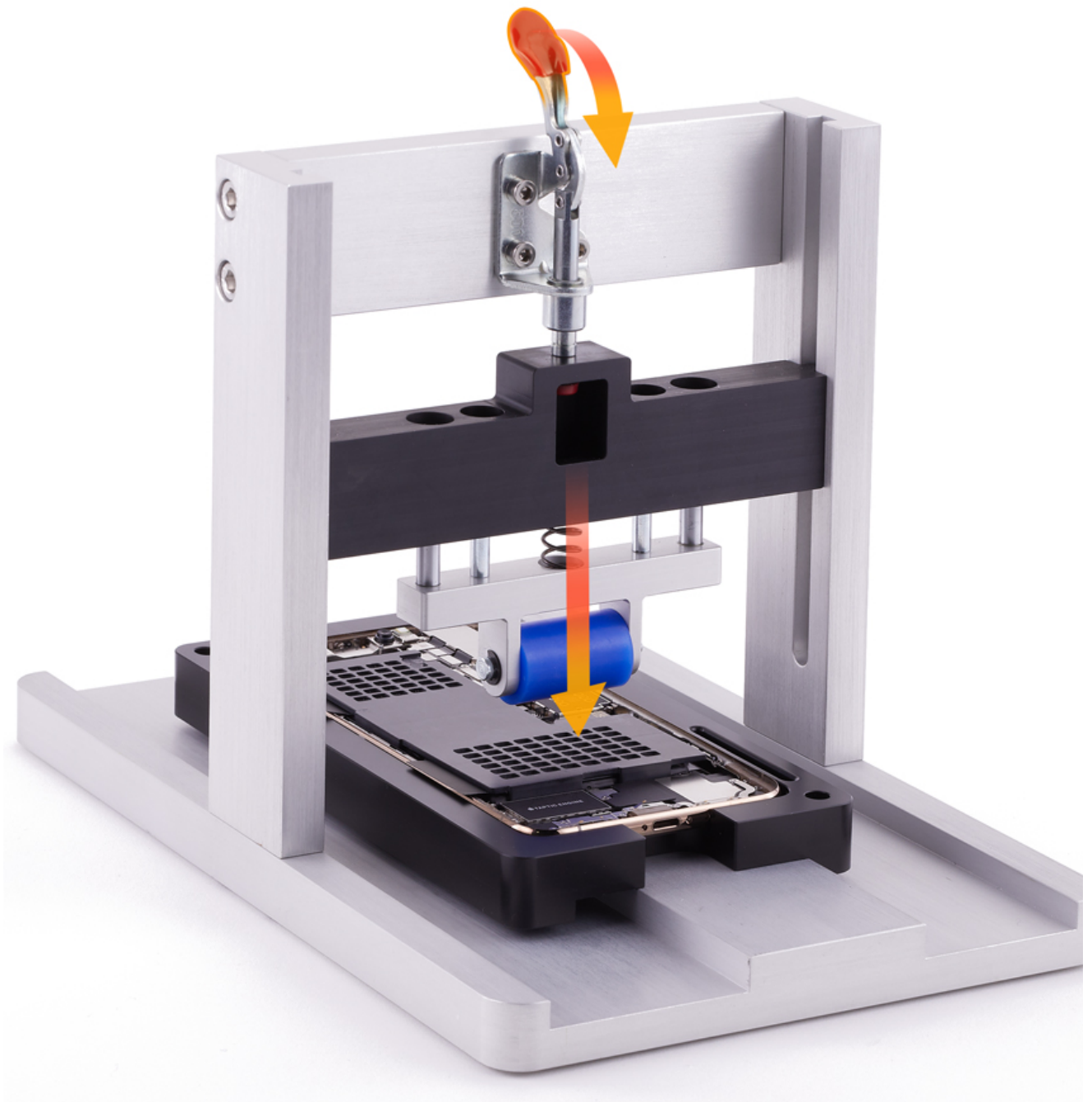


9. Make sure that the alignment pin of the iPhone Battery Fixture roller is in the shorter slot of the repair tray.

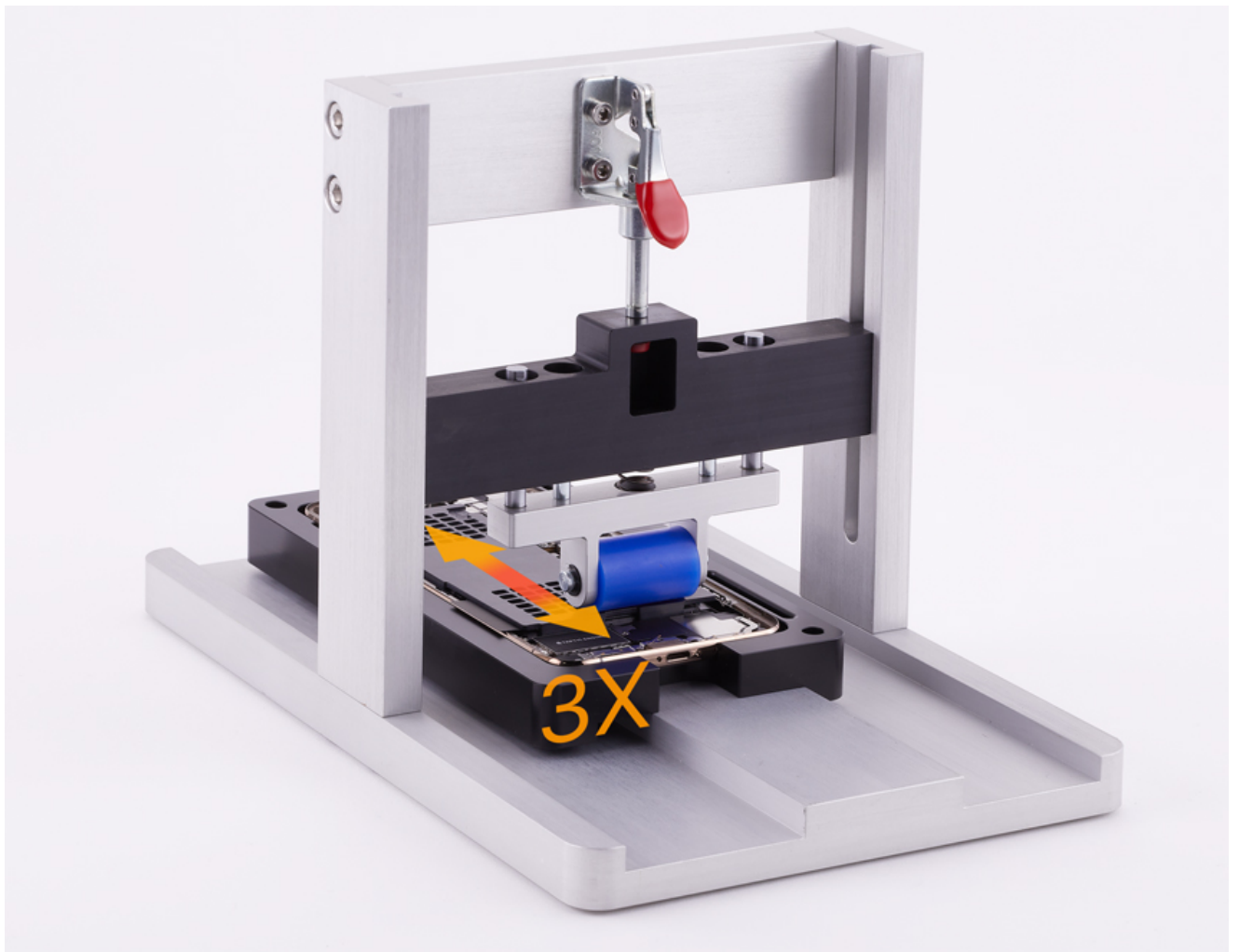


10. Lower the red lever to move the pressure roller into place above the iPhone battery.

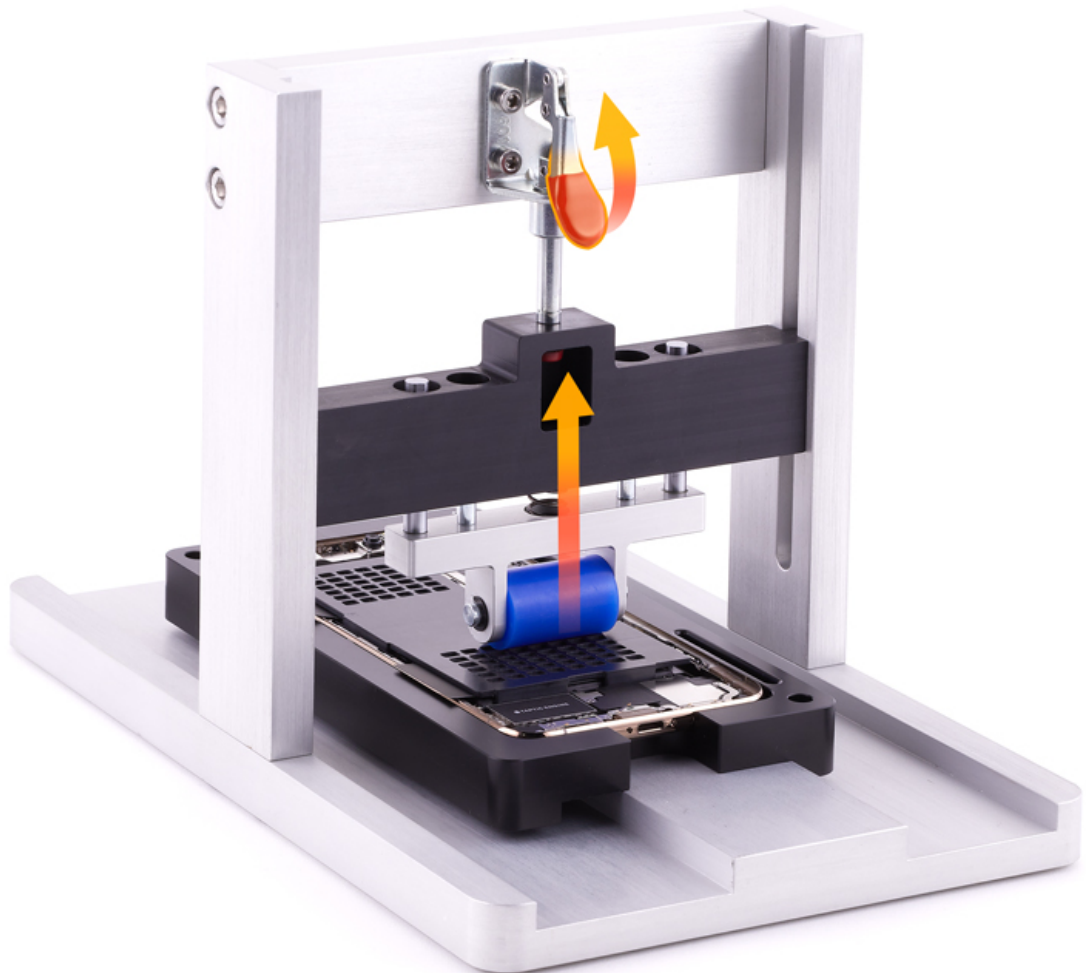




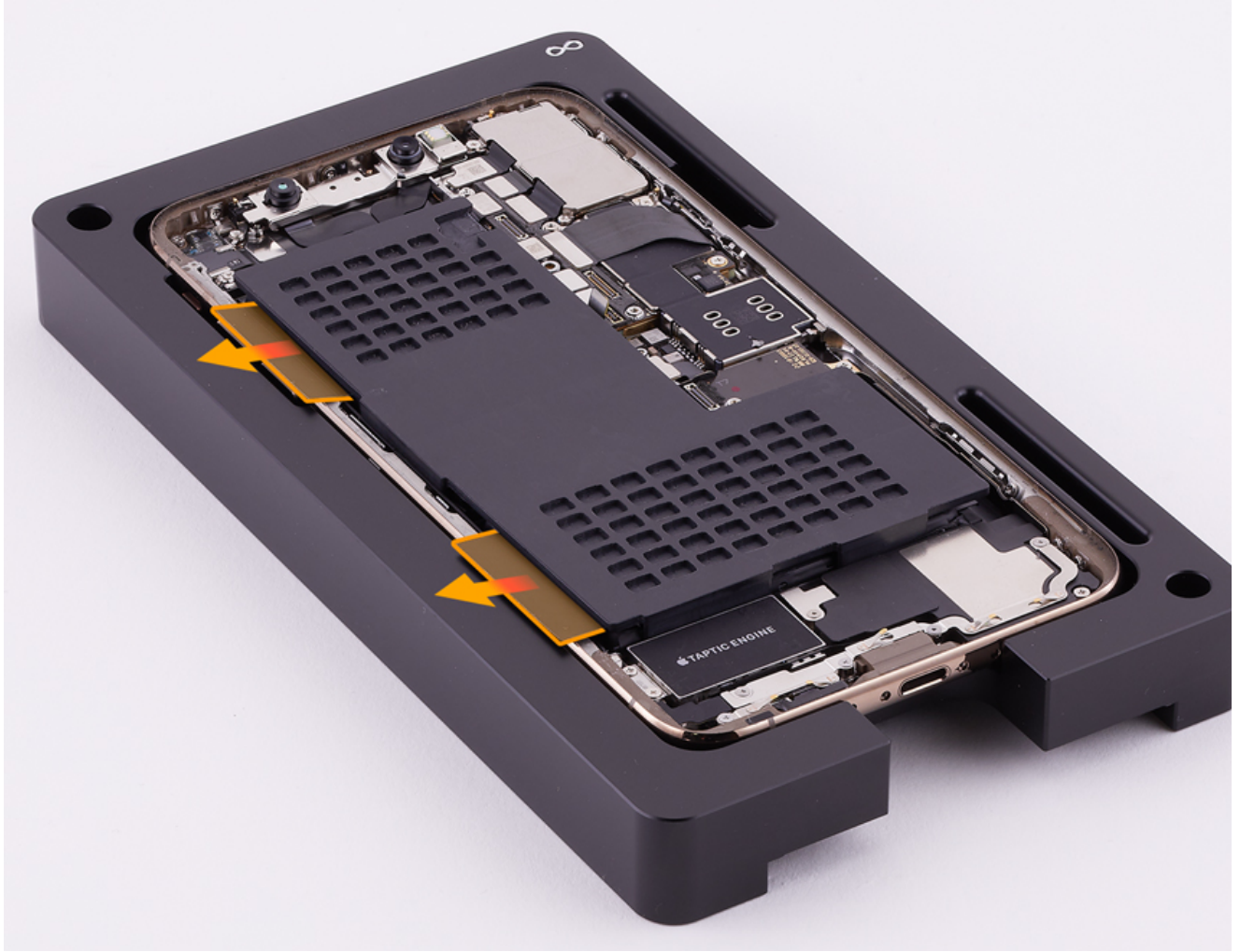
11. Slide the tray through the tower until the end of the range of motion. Repeat three times. This will cause the roller to press the battery down onto the adhesive strip.



12. Raise the red lever to raise the pressure roller.



13. Pull the release tabs on the protective cover and remove it from the battery. Hold the edges of the battery cover when pulling the tabs.



14. Follow the reassembly steps in [RP1443: Open Device](#).
15. Gently shake the iPhone and listen for a battery rattling sound. If the battery is moving, then [open device](#), repeat reassembly steps 5 through 12, and [close device](#). If rattling still occurs, then replace the battery with a new battery.
16. Run the recommended AST 2 diagnostic suites found in [TP1570: Diagnostics Mode](#).
17. **Important:** Check iPhone operation using the steps in [TP1045: Functional Test](#).

# Completing an iPhone Repair

## Test Functionality

Test the device according to the procedures outlined in [TP1045: Functional Test](#). Test the affected functions to attempt to repeat the original issues reported by the user.

Make sure the device is 100 percent operational before returning it to the user.

## Verify Cellular Account

Make sure that the user's SIM card is installed and ask the user to verify that their phone number is correct in Settings > Phone.

## Clean Device

Clean the device with a microfiber polishing cloth. **Caution:** Do not use chemicals or liquids.

## Handle Defective Parts

Return all defective modules to Apple. Reuse the packaging that contained the replacement parts.

# iPhone Functional Test

The iPhone functional test determines the functional state of an iOS device before and after a repair. Before a repair, use the iPhone functional test to determine if additional service is needed. After a repair, for devices running 10.3 or later, use Diagnostics Mode to run the AST 2 Post-Repair Diagnostic to verify the device's functionality. Refer to [TP1570: Diagnostics Mode](#) for information about Diagnostic Mode. Devices running iOS 10.2.1 or earlier should continue to use the functional tests listed in this article. **Note:** Some feature-specific tests may not apply to the device under test.

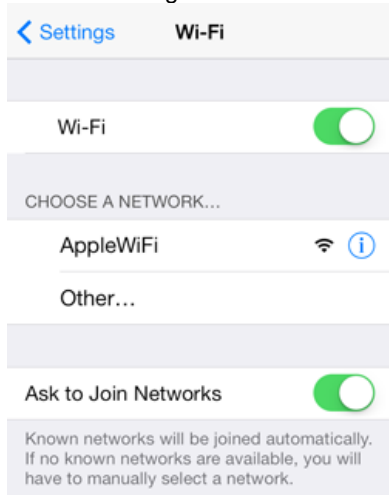
Attempt to repeat the original issue or issues reported by the user and verify that no new issues are present after opening the device. If the user is reporting battery issues, use AST 2 to test the battery. Confirm that the device is fully operational before returning it to the user. Use AST 2 diagnostics to assist in testing for reported issues. See [TP1279: Supported Products and Tests](#) for more information on AST 2 diagnostics.

Test the following components:

1. Cellular and Wi-Fi Connectivity, Video Playback, and Speaker Sound Quality
2. Bluetooth
3. Headset and Proximity Sensor
4. Bottom Mic, Speaker, and Receiver Sound Quality
5. Cameras, Rear Mic, and Front Mic
6. Multi-Touch and Accelerometer
7. Buttons, Switches, and Vibe
8. Ambient Light Sensor
9. Location Services
10. Touch ID (iPhone 5s, iPhone SE, iPhone 6, iPhone 6 Plus, iPhone 6s, iPhone 6s Plus, iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus)
11. 3D Touch and Taptic Engine (iPhone 6s and later, excluding iPhone SE)
12. True Tone Display (iPhone 8 and later)
13. Face ID (iPhone X and later)

## 1. Test Cellular and Wi-Fi Connectivity, Video Playback, and Speaker Sound Quality

- a. Run the Mobile Resource Inspector (MRI) diagnostic suite in AST 2 to test for the presence of Wi-Fi hardware.
- b. Check that the user's SIM card is installed. Ask the user to verify that their phone number is correct in Settings > Phone.
- c. Call an approved toll-free number to test phone call cellular connectivity and sound quality.
- d. Go to Settings > Wi-Fi and connect to a known-good 2.4GHz Wi-Fi network.



- e. Play video from apple.com and verify that the video and audio play correctly. This will test the video playback and the speaker. For iPhone 7 and later, hold the device in landscape orientation. Go to Settings > General > Accessibility and adjust balance to the left, and then to the right. Be sure that Mono Audio is turned off. Replay the video to test the left and right speakers in isolation.
- f. Repeat steps d and e while connected to a 5GHz network, if available.

## 2. Test Bluetooth

- a. Run the MRI diagnostic suite in AST 2 to test for the presence of Bluetooth hardware.
- b. Make a known-good Bluetooth device available locally. Check that the Bluetooth device is on and discoverable.
- c. On the customer's device, go to Settings > Bluetooth.
- d. Verify that Bluetooth is on. The device will search for nearby Bluetooth devices.



- e. Pair the user's device with the Bluetooth device.
- f. To unpair the device, tap the blue circle to the right of the device's name and then tap "Forget this Device."

## 3. Test Headset and Proximity Sensor

- a. Open the Voice Memos app.



- b. Tap the red circle to start recording.
- c. Place your hand over the top front of the device to cover the proximity sensor. The screen should go black.
- d. Remove your hand to uncover the proximity sensor. The Voice Memos screen should reappear.
- e. Connect EarPods to the device.
- f. Blow into the headset microphone to verify functionality.
- g. Tap Done to end the recording.
- h. Enter a name for the recording, then tap Save.
- i. Tap the recording to play it.
- j. Listen to the playback through the EarPods, and adjust the volume using the headset remote control.
- k. Make a test phone call with a known-good SIM and with full cellular signal strength for at least one minute. During the call, verify the sound quality of the EarPods and headset microphone.



#### 4. Test Bottom Mic, Speaker, and Receiver Sound Quality

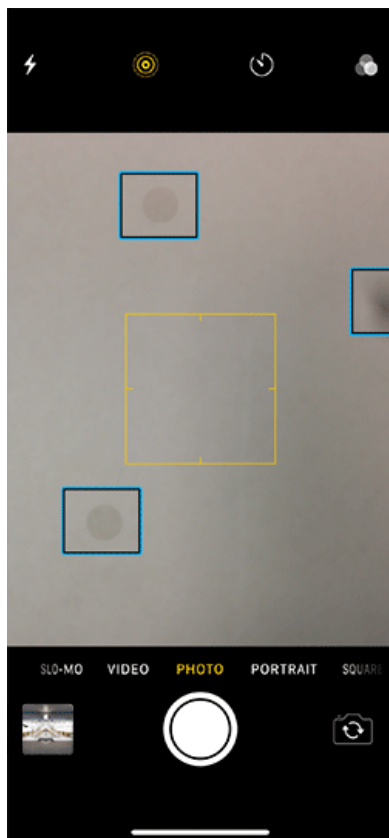
- a. Open the Voice Memos app.



- b. Record a short voice memo by tapping the red circle.
- c. When finished recording, tap Done.
- d. Name the recording, then tap Save.
- e. Tap the recording.
- f. Tap the blue sideways triangle play button to begin playback. **Note:** To toggle between receiver and speaker, use the Speaker button in the top right corner of the display.
- g. Make a test phone call with a known-good SIM and with full cellular signal strength for at least one minute. During the call, verify the sound quality of the receiver, speaker, and microphone.

#### 5. Test Cameras, Rear Mic, and Front Mic

- a. Run the MRI diagnostic suite in AST 2 to test for the presence of front and rear cameras.
- b. Remove any protective case that may interfere with the camera lens or flash.
- c. Download the [iPhone Camera Test Image](#) (PDF) and print out a color copy on unlaminated white paper. Do not modify, alter, or laminate the copy.
- d. Open the Camera app. Aim the back of the device at a clean sheet of blank white paper.
- e. Slowly move the device to inspect the preview image for anomalies, such as circles and dust spots.



f. Record video with the camera. Test the camera and rear mic by checking the recording for video and audio quality.

g. Take photos and check focusing with the camera.

- Start in landscape orientation and hold the device eight inches (~20 cm) from the test image.  
**iPhone 6 or later:** The test image should quickly come into focus.  
**Other models:** Once steady, the yellow focus square should appear briefly and the test image should be in focus.
- Keep the device in landscape orientation and hold the device three feet (~1 m) from the test image.  
**iPhone 6 or later:** The test image should quickly come into focus.  
**Other models:** Once the device is steady, the yellow focus square should appear shortly, with the test image eventually brought into focus.
- Rotate the device to portrait orientation and hold the device three feet (~1 m) from the test image.  
**iPhone 6 or later:** In a well-lit room, the test image should stay in focus as you rotate. If the room is not well lit, the yellow focus square may appear. The image should not jump around or be severely out of focus during rotation.  
**Other models:** Once the device is steady, even though the test image is already in focus, the yellow focus square may still appear in the preview indicating that the camera is trying to refocus. This is normal. Once the focus is complete, the test image should still be in focus.
- Keep the device in portrait orientation and hold the device eight inches (~20 cm) from the test image.  
**iPhone 6 or later:** The test image should quickly come into focus.  
**Other models:** Once the device is steady, the yellow focus square should appear shortly, with the test image eventually coming into focus.
- Verify that the primary colors are representative of the printed test image and that there are no dark spots near the edges of the photo.

h. Change the focus area and set the exposure: The yellow square on the screen shows the area where the camera is focusing the shot. Tap the screen to focus on the circle of the test image.

i. Turn on the flash.

- If possible, take the photo in a dim or darkened area to show where the flash is lighting.
- Check that the flash is lighting the circle in the test image and that the flash is not shifted to one side.

j. Pinch the screen, then drag the slider at the bottom of the screen to zoom in or out.

k. Touch the icon to select the FaceTime or TrueDepth camera. Repeat steps d through i (above) to test the

FaceTime or TrueDepth camera, front mic, and the Retina Flash. **Note:** The FaceTime or TrueDepth camera does not zoom, and only has a flash on iPhone 6s, 6s Plus, SE, 7, 7 Plus, 8, 8 Plus, X, Xs, Xs Max. The Retina Flash is only available in photo, portrait, and square modes. It may be easier to hold the printed test image in front of the iPhone to test the FaceTime camera.

#### **Additional Testing for iPhone 5c and later:**

Use the camera slow-motion mode to record short videos of the printed test image and verify video quality.

- a. Switch the camera to slow-motion mode and keep the device in either landscape or portrait orientation.
- b. Set to 1x zoom, hold the device eight inches (~20 cm) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.
- c. Stay in 1x zoom, hold the device three feet (~1 m) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.
- d. Tap 1x to switch to 2x zoom, hold the device three feet (~1 m) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.
- e. Stay in 2x zoom, hold the device 20 inches (~50 cm) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.

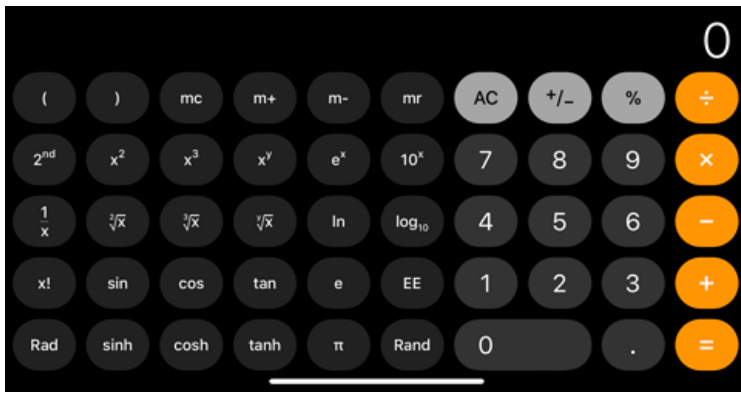
#### **6. Test Multi-Touch and Accelerometer**

a. Run the following AST 2 diagnostic suites: use Multi-Touch to test for Multi-Touch response issues; use Unexpected Touch to test for overly sensitive touch response issues; use MRI to test for the presence of Multi-Touch and Accelerometer hardware.

b. Open the Calculator app to test all but the top section of the screen. Hold the device in a vertical plane (upright), not horizontal (flat). Tap each button on the calculator to verify activity.



c. Rotate the device 90 degrees to the left to launch the scientific calculator. Tap each of the buttons. Rotate the device 180 degrees to the right and tap each of the buttons.



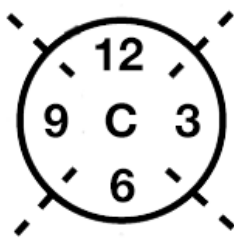
## 7. Test Buttons, Switches, and Vibe

a. Run each of the button and switch diagnostic suites in AST 2. Each suite tests the functionality of a specific button or switch.

b. Test the Home button using the following steps, depending on model:

### iPhone 6s, 6s Plus, SE, and earlier

- Test clicks and double-clicks on the Home button.
- Press and hold the Home button for Voice Control or Siri.
- With the display off, press the center of the Home button and verify that the display turns on.
- Use the pointed end of a black stick to repeat the same test for the top, bottom, left, and right edges of the Home button (as shown by the numbers in the image below). The display should turn on when pressing any of these five locations.



- If no functional issues are found after testing the button with a black stick, use your finger or thumb to test for button stiffness, looseness, or mechanical symptoms.

### iPhone 7, 7 Plus, 8, 8 Plus

- Test single-clicks and double-clicks on the Home button.
- Press and hold the Home button for Voice Control or Siri.
- With the display off, press the center of the Home button and verify that the display turns on.
- When pressing the Home button, verify that the haptic feedback simulates a physical button press.
- If the Home button does not respond in the above steps, test Touch ID functionality in Section 10 of this article.

c. Use your finger to repeatedly press the volume buttons and verify that the sound level indicator on the display is changing.

d. Use your finger to toggle the Ring/Silent switch back and forth and look for a bell icon on the screen.

e. Press the Ring/Silent switch and verify that the bell icon does not appear on the screen. **Note:** Do not toggle the switch.

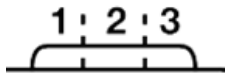
f. Test the vibrate function.

1. Go to Settings > Sounds > Ringtone > Vibration.
2. Choose S.O.S.
3. Verify that the phone vibrates in the correct pattern.

g. Locate the Sleep/Wake or side button on the device, near the top right corner or right edge. **(All iPhone models)**

- Use the pointed end of a black stick to press the left side of the button (1) once, to put the device into sleep mode (the display will turn off).
- Use the pointed end of a black stick to press the center of the button (2) once, to wake the device.

- Use the pointed end of a black stick to press the right side of the button (3) once, to put the device into sleep mode (the display will turn off).
- Use your finger to press the button again to wake the device.
- Use your finger to press and hold down the button until "slide to power off" appears on the screen.



h. If no functional issues are found after testing buttons with a black stick, use your finger or thumb to test for button stiffness, looseness, or mechanical symptoms.

## 8. Test Ambient Light Sensor

The ambient light sensor automatically adjusts the display brightness to an appropriate level for the current ambient light conditions. The ambient light sensor brightens the display when using the device in a bright light environment, and dims the display in low light.

- Run the MRI diagnostic suite in AST 2 to test for the presence of ambient light sensor hardware.
- Toggle Auto-Brightness off and then on in Settings > General > Accessibility > Display Accommodations.
- Press the Sleep/Wake button or side button to put the device into sleep mode.
- In a bright light environment, cover the top third of the front of the device to block the light (the base of your hand works well). The ambient light sensor is located near the receiver.
- Press the Sleep/Wake or side button to wake the device. While the ambient light sensor is covered, the display should be dim.
- Uncover the top of the device. After a few seconds, the display should return to its normal brightness.

## 9. Test Location Services

Location services depend on data service availability. Data services are subject to change and may not be available in all areas. This may result in unavailable, inaccurate, or incomplete maps, directions, or location-based information. Maps uses Wi-Fi hotspots to determine the most accurate location. Refer to [HT203033: About privacy and Location Services in iOS 8 and later](#) for more information.

- Run the MRI diagnostic suite in AST 2 to test for the presence of gyroscope and compass hardware.
- Go to Settings > Privacy > Location Services and turn on Location Services.

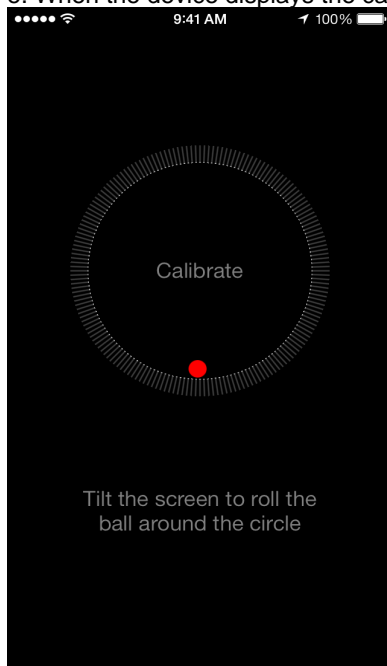


- Open the Maps app and tap the arrow in the lower left corner of the screen. Maps should display the device's current location.



d. Open the Compass app.

e. When the device displays the calibration alert, tilt the screen to move the red ball around the circle.



f. Verify that when the iPhone is rotated, the heading shown on the screen changes according to the motion of the device.

## 10. Test Touch ID (iPhone 5s, SE, 6, 6 Plus, 6s, 6s Plus, 7, 7 Plus, 8, 8 Plus)

This test should be performed with the user. Ensure that the Home button and your finger are clean and dry.

- Run the MRI diagnostic suite in AST 2 to test for the presence of Touch ID hardware.
- Go to Settings > Touch ID & Passcode and tap "Add a Fingerprint..."
- Hold the device as you normally would when touching the Home button.
- Touch your finger to the Home button and hold it there until you feel a quick vibration or you are asked to lift your finger. **Tip:** Do not press the button, just touch it lightly.
- Continue to touch and lift your finger slowly, making small adjustments to the position of your finger each time.
- Once the initial scanning is complete, you will be asked to adjust your grip in order to capture the edges of your fingerprint.



g. Hold the device as you normally would when unlocking it, touching the adjacent outer areas of your fingertip instead of the center portion you initially scanned.

h. Press the Sleep/Wake button or side button to lock the screen.

i. Press the Home button, Sleep/Wake button, or side button once to wake the device and keep your finger lightly on the Home button. The device will unlock when the fingerprint is recognized.

## 11. Test 3D Touch and Taptic Engine (iPhone 6s and later, excluding iPhone SE)

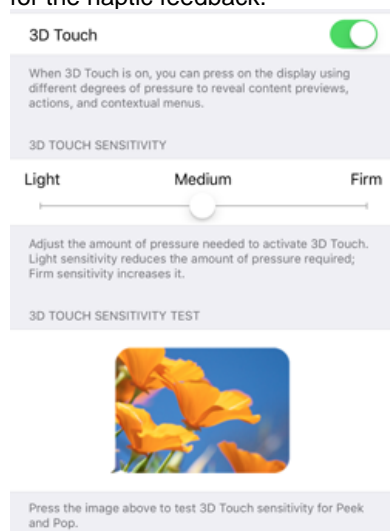
This test should be performed with the user.

**Note:** The iPhone must pass the Multi-Touch test above or the AST 2 Multi-Touch, Unexpected Touch, and MRI diagnostic suites.

a. Go to Settings > General > Accessibility > 3D Touch and confirm that the 3D Touch setting is enabled and sensitivity is set to Medium. 3D Touch must be enabled for 3D Touch and Taptic Engine functionality.

b. Go to Settings > General > Accessibility > Vibration to enable the Taptic Engine.

c. Use the 3D Touch Sensitivity Test to check the Peek and Pop functions. Look for the visual feedback and feel for the haptic feedback.



Peek



Pop

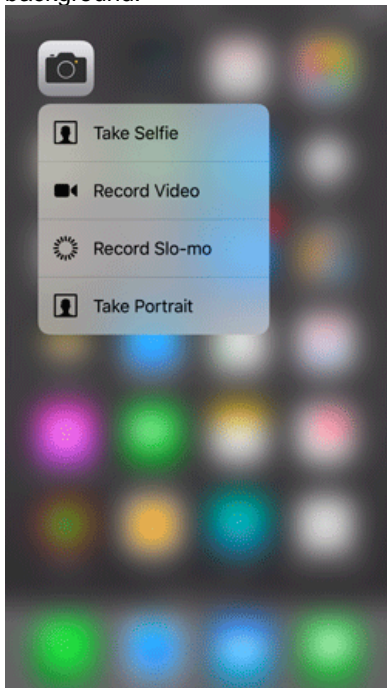


d. Press the Home button to return to the Home screen.

e. Hold iPhone with the display perpendicular to the floor.

f. Firmly press on one icon in the center of the display to test 3D Touch. Look for visual feedback. If the app does

not support 3D Touch, then the area around the app icon will blur momentarily and provide haptic feedback then return to the Home screen. If the app supports 3D Touch, then a contextual menu will appear with a blurred background.



g. Feel for haptic feedback when pressing the app icons.

h. Hold the iPhone with the display parallel to the floor and repeat steps f and g.

## 12. Test True Tone display (iPhone 8 and later)

This test should be performed with the user to verify the True Tone display.

a. Toggle True Tone off and then on in Settings > Display & Brightness

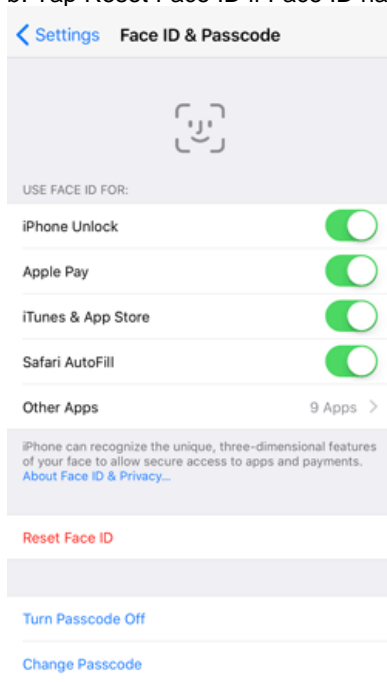
b. Make sure that the tint of the white displayed changes when True Tone is toggled on and off.

## 13. Test Face ID (iPhone X and later)

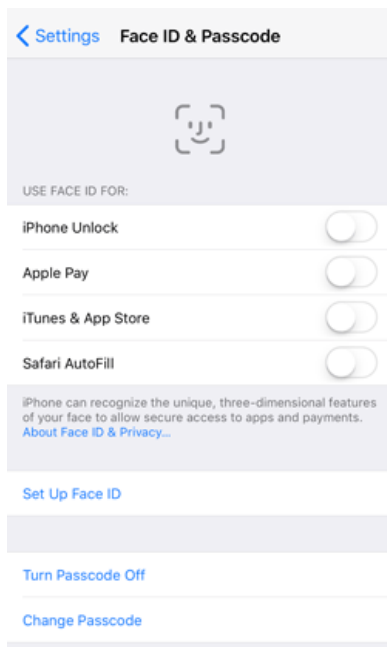
This test should be performed with the user to verify Face ID.

a. Go to Settings > Face ID & Passcode

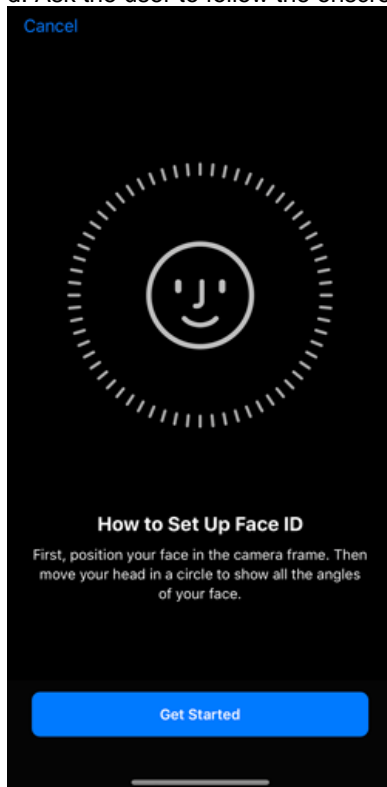
b. Tap Reset Face ID if Face ID has been enabled.



c. Tap Set Up Face ID.



d. Ask the user to follow the onscreen instructions.



## Service Content Feedback

This escalation path is intended only for content issues with articles that begin with the prefixes IT, OP, RP, SD, SM, TP, and SV.

Article prefix	Escalate to
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OP, RP, SD, SM, TP	serviceguides@group.apple.com
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Please provide the following information:

- Description of the content issue encountered and steps to reproduce
- Article number and title
- Serial number
- Screenshots or screen recording

**Note:** The service content team reads every email but can't always respond.